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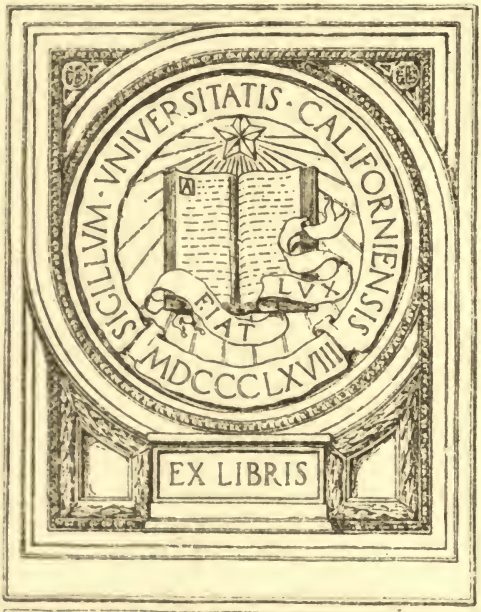

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THE WRITINGS OF JOHN MUIR

Manuscript Edition

VOLUME V

THE MOUNTAINS OF CALIFORNIA

II

BY

JOHN MUIR

BOSTON AND NEW YORK
HOUGHTON MIFFLIN COMPANY
MDCCCCXVI

UNIV. OF
CALIFORNIA

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ILLUSTRATIONS

EL CAPITAN, YOSEMITE NATIONAL PARK *Frontispiece*

"It is 3300 feet high, a plain, severely simple, glacier-sculptured face of granite, the end of one of the most compact and enduring of the mountain ridges, unrivaled in height and breadth and flawless strength."

From a photograph by Charles S. Olcott

A WATER-OUZEL AND NEST 24

This ouzel and its nest were found on a rock in King's River Cañon, only a few feet above the stream.

From a photograph by Herbert W. Gleason

MIRROR LAKE 138

Mount Watkins is seen in the distance.

From a photograph by Charles S. Olcott

FAIRVIEW DOME 204

A view from the north, showing the striking outline of the Dome, with a number of "glacial erratics" on the rocky pavement in the foreground. The crown of the dome is 10,000 feet above the sea-level.

From a photograph by Herbert W. Gleason

SENTINEL ROCK, YOSEMITE NATIONAL PARK . . 222

A telling monument of the glacial period, rising 3100 feet from the floor of the valley. The photograph was taken during a typical Yosemite shower and shows the curious appearance of rain below the cloud while the atmosphere above is clear.

From a photograph by Charles S. Olcott

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In the Hetch Hetchy Valley 278

The photograph is taken from a point northeast of Kolana Rock, — the dominating cliff of the valley, — and shows also some of the characteristic oaks and ferns of the valley floor.

From a photograph by Herbert W. Gleason

Travel Guide Map of the Yosemite Valley . 292

THE MOUNTAINS OF CALIFORNIA

VOLUME II

THE MOUNTAINS OF CALIFORNIA

CHAPTER XII

SIERRA THUNDERSTORMS

THE weather of spring and summer in the middle region of the Sierra is usually well flecked with rains and light dustings of snow, most of which are far too obviously joyful and life-giving to be regarded as storms; and in the picturesque beauty and clearness of outlines of their clouds they offer striking contrasts to those boundless, all-embracing cloud-mantles of the storms of winter. The smallest and most perfectly individualized specimens present a richly modeled cumulus cloud rising above the dark woods, about 11 A.M., swelling with a visible motion straight up into the calm, sunny sky to a height of twelve to fourteen thousand feet above the sea, its white, pearly bosses relieved by gray and pale purple shadows in the hollows, and showing outlines as keenly defined as those of the glacier-polished domes. In less than an hour it attains full development and stands

poised in the blazing sunshine like some colossal mountain, as beautiful in form and finish as if it were to become a permanent addition to the landscape. Presently a thunderbolt crashes through the crisp air, ringing like steel on steel, sharp and clear, its startling detonation breaking into a spray of echoes against the cliffs and cañon walls. Then down comes a cataract of rain. The big drops sift through the pine needles, plash and patter on the granite pavements, and pour down the sides of ridges and domes in a network of gray, bubbling rills. In a few minutes the cloud withers to a mesh of dim filaments and disappears, leaving the sky perfectly clear and bright, every dust particle wiped and washed out of it. Everything is refreshed and invigorated, a steam of fragrance rises, and the storm is finished — one cloud, one lightning stroke, and one dash of rain. This is the Sierra mid-summer thunderstorm reduced to its lowest terms. But some of them attain much larger proportions, and assume a grandeur and energy of expression hardly surpassed by those bred in the depths of winter, producing those sudden floods called "cloudbursts," which are local, and to a considerable extent periodical, for they appear nearly every day about the same time for weeks, usually about eleven o'clock, and lasting from five

minutes to an hour or two. One soon becomes so accustomed to see them that the noon sky seems empty and abandoned without them, as if Nature were forgetting something. When the glorious pearl and alabaster clouds of these noonday storms are being built I never give attention to anything else. No mountain or mountain range, however divinely clothed with light, has a more enduring charm than those fleeting mountains of the sky — floating fountains bearing water for every well, the angels of the streams and lakes; brooding in the deep azure, or sweeping softly along the ground over ridge and dome, over meadow, over forest, over garden and grove; lingering with cooling shadows, refreshing every flower, and soothing rugged rock brows with a gentleness of touch and gesture wholly divine.

The most beautiful and imposing of the summer storms rise just above the upper edge of the silver fir zone, and all are so beautiful that it is not easy to choose any one for particular description. The one that I remember best fell on the mountains near Yosemite Valley, July 19, 1869, while I was encamped in the silver fir woods. A range of bossy cumuli took possession of the sky, huge domes and peaks rising one beyond another with deep cañons between them, bending this way and that in long curves

and reaches, interrupted here and there with white upboiling masses that looked like the spray of waterfalls. Zigzag lances of lightning followed each other in quick succession, and the thunder was so gloriously loud and massive it seemed as if surely an entire mountain was being shattered at every stroke. Only the trees were touched, however, so far as I could see, — a few firs two hundred feet high, perhaps, and five to six feet in diameter, were split into long rails and slivers from top to bottom and scattered to all points of the compass. Then came the rain in a hearty flood, covering the ground and making it shine with a continuous sheet of water that, like a transparent film or skin, fitted closely down over all the rugged anatomy of the landscape.

It is not long, geologically speaking, since the first raindrop fell on the present landscapes of the Sierra; and in the few tens of thousands of years of stormy cultivation they have been blest with, how beautiful they have become! The first rains fell on raw, crumbling moraines and rocks without a plant. Now scarcely a drop can fail to find a beautiful mark: on the tops of the peaks, on the smooth glacier pavements, on the curves of the domes, on moraines full of crystals, on the thousand forms of yosemitic sculpture with their tender beauty of

balmy, flowery vegetation, laving, plashing, glinting, pattering; some falling softly on meadows, creeping out of sight, seeking and finding every thirsty rootlet, some through the spires of the woods, sifting in dust through the needles, and whispering good cheer to each of them; some falling with blunt tapping sounds, drumming on the broad leaves of veratrum, cypripedium, saxifrage; some falling straight into fragrant corollas, kissing the lips of lilies, glinting on the sides of crystals, on shining grains of gold; some falling into the fountains of snow to swell their well-saved stores; some into the lakes and rivers, patting the smooth glassy levels, making dimples and bells and spray, washing the mountain windows, washing the wandering winds; some plashing into the heart of snowy falls and cascades as if eager to join in the dance and the song and beat the foam yet finer. Good work and happy work for the merry mountain raindrops, each one of them a brave fall in itself, rushing from the cliffs and hollows of the clouds into the cliffs and hollows of the mountains; away from the thunder of the sky into the thunder of the roaring rivers. And how far they have to go, and how many cups to fill — cassiope cups, holding half a drop, and lake basins between the hills, each replenished with equal care — every drop God's messenger

sent on its way with glorious pomp and display of power — silvery newborn stars with lake and river, mountain and valley — all that the landscape holds — reflected in their crystal depths.

CHAPTER XIII

THE WATER-OUZEL

THE waterfalls of the Sierra are frequented by only one bird, — the ouzel or water thrush (*Cinclus Mexicanus*, Sw.). He is a singularly joyous and lovable little fellow, about the size of a robin, clad in a plain waterproof suit of bluish gray, with a tinge of chocolate on the head and shoulders. In form he is about as smoothly plump and compact as a pebble that has been whirled in a pot-hole, the flowing contour of his body being interrupted only by his strong feet and bill, the crisp wing-tips, and the up-slanted wren-like tail.

Among all the countless waterfalls I have met in the course of ten years' exploration in the Sierra, whether among the icy peaks, or warm foothills, or in the profound yosemitic cañons of the middle region, not one was found without its ouzel. No cañon is too cold for this little bird, none too lonely, provided it be rich in falling water. Find a fall, or cascade, or rushing rapid, anywhere upon a clear stream, and there you will surely find its complementary ouzel, flitting about in the spray, diving in foaming eddies, whirling like a leaf among

beaten foam bells; ever vigorous and enthusiastic, yet self-contained, and neither seeking nor shunning your company.

If disturbed while dipping about in the margin shallows, he either sets off with a rapid whir to some other feeding-ground up or down the stream, or alights on some half-submerged rock or snag out in the current, and immediately begins to nod and courtesy like a wren, turning his head from side to side with many other odd dainty movements that never fail to fix the attention of the observer.

He is the mountain streams' own darling, the hummingbird of blooming waters, loving rocky ripple slopes and sheets of foam as a bee loves flowers, as a lark loves sunshine and meadows. Among all the mountain birds, none has cheered me so much in my lonely wanderings, — none so unfailingly. For both in winter and summer he sings, sweetly, cheerily, independent alike of sunshine and of love, requiring no other inspiration than the stream on which he dwells. While water sings, so must he, in heat or cold, calm or storm, ever attuning his voice in sure accord; low in the drought of summer and the drought of winter, but never silent.

During the golden days of Indian summer, after most of the snow has been melted, and

the mountain streams have become feeble, — a succession of silent pools, linked together by shallow, transparent currents and strips of silvery lacework, — then the song of the ouzel is at its lowest ebb. But as soon as the winter clouds have bloomed, and the mountain treasuries are once more replenished with snow, the voices of the streams and ouzels increase in strength and richness until the flood season of early summer. Then the torrents chant their noblest anthems, and then is the flood-time of our songster's melody. As for weather, dark days and sun days are the same to him. The voices of most song birds, however joyous, suffer a long winter eclipse; but the ouzel sings on through all the seasons and every kind of storm. Indeed, no storm can be more violent than those of the waterfalls in the midst of which he delights to dwell. However dark and boisterous the weather, snowing, blowing, or cloudy, all the same he sings, and with never a note of sadness. No need of spring sunshine to thaw *his* song, for it never freezes. Never shall you hear anything wintery from *his* warm breast; no pinched cheeping, no wavering notes between sorrow and joy; his mellow, fluty voice is ever tuned to downright gladness, as free from dejection as cock-crowing.

It is pitiful to see wee frost-pinched sparrows

on cold mornings in the mountain groves shaking the snow from their feathers, and hopping about as if anxious to be cheery, then hastening back to their hidings out of the wind, puffing out their breast feathers over their toes, and subsiding among the leaves, cold and breakfastless, while the snow continues to fall, and there is no sign of clearing. But the ouzel never calls forth a single touch of pity; not because he is strong to endure, but rather because he seems to live a charmed life beyond the reach of every influence that makes endurance necessary.

One wild winter morning, when Yosemite Valley was swept its length from west to east by a cordial snowstorm, I sallied forth to see what I might learn and enjoy. A sort of gray, gloaming-like darkness filled the valley, the huge walls were out of sight, all ordinary sounds were smothered, and even the loudest booming of the falls was at times buried beneath the roar of the heavy-laden blast. The loose snow was already over five feet deep on the meadows, making extended walks impossible without the aid of snowshoes. I found no great difficulty, however, in making my way to a certain ripple on the river where one of my ouzels lived. He was at home, busily gleaning his breakfast among the pebbles of a shallow portion of the margin, apparently unaware of

anything extraordinary in the weather. Presently he flew out to a stone against which the icy current was beating, and turning his back to the wind, sang as delightfully as a lark in springtime.

After spending an hour or two with my favorite, I made my way across the valley, boring and wallowing through the drifts, to learn as definitely as possible how the other birds were spending their time. The Yosemite birds are easily found during the winter because all of them excepting the ouzel are restricted to the sunny north side of the valley, the south side being constantly eclipsed by the great frosty shadow of the wall. And because the Indian Cañon groves, from their peculiar exposure, are the warmest, the birds congregate there, more especially in severe weather.

I found most of the robins cowering on the lee side of the larger branches where the snow could not fall upon them, while two or three of the more enterprising were making desperate efforts to reach the mistletoe berries by clinging nervously to the under side of the snow-crowned masses, back downward, like woodpeckers. Every now and then they would dislodge some of the loose fringes of the snow-crown, which would come sifting down on them and send them screaming back to camp, where

they would subside among their companions with a shiver, muttering in low, querulous chatter like hungry children.

Some of the sparrows were busy at the feet of the larger trees gleaning seeds and benumbed insects, joined now and then by a robin weary of his unsuccessful attempts upon the snow-covered berries. The brave woodpeckers were clinging to the snowless sides of the larger boles and overarching branches of the camp trees, making short flights from side to side of the grove, pecking now and then at the acorns they had stored in the bark, and chattering aimlessly as if unable to keep still, yet evidently putting in the time in a very dull way, like storm-bound travelers at a country tavern. The hardy nuthatches were threading the open furrows of the trunks in their usual industrious manner, and uttering their quaint notes, evidently less distressed than their neighbors. The Steller jays were, of course, making more noisy stir than all the other birds combined; ever coming and going with loud bluster, screaming as if each had a lump of melting sludge in his throat, and taking good care to improve the favorable opportunity afforded by the storm to steal from the acorn stores of the woodpeckers. I also noticed one solitary gray eagle braving the storm on the top of a tall pine stump just out-

side the main grove. He was standing bolt upright with his back to the wind, a tuft of snow piled on his square shoulders, a monument of passive endurance. Thus every snow-bound bird seemed more or less uncomfortable if not in positive distress. The storm was reflected in every gesture, and not one cheerful note, not to say song, came from a single bill; their cowering, joyless endurance offering a striking contrast to the spontaneous, irrepressible gladness of the ouzel, who could no more help exhaling sweet song than a rose sweet fragrance. He *must* sing, though the heavens fall. I remember noticing the distress of a pair of robins during the violent earthquake of the year 1872, when the pines of the Valley, with strange movements, flapped and waved their branches, and beetling rock brows came thundering down to the meadows in tremendous avalanches. It did not occur to me in the midst of the excitement of other observations to look for the ouzels, but I doubt not they were singing straight on through it all, regarding the terrible rock thunder as fearlessly as they do the booming of the waterfalls.

What may be regarded as the separate songs of the ouzel are exceedingly difficult of description, because they are so variable and at the same time so confluent. Though I have been

acquainted with my favorite ten years, and during most of this time have heard him sing nearly every day, I still detect notes and strains that seem new to me. Nearly all of his music is sweet and tender, lapsing from his round breast like water over the smooth lip of a pool, then breaking farther on into a sparkling foam of melodious notes, which glow with subdued enthusiasm, yet without expressing much of the strong, gushing ecstasy of the bobolink or skylark.

The more striking strains are perfect arabesques of melody, composed of a few full, round, mellow notes, embroidered with delicate trills which fade and melt in long slender cadences. In a general way his music is that of the streams refined and spiritualized. The deep booming notes of the falls are in it, the trills of rapids, the gurgling of margin eddies, the low whispering of level reaches, and the sweet tinkle of separate drops oozing from the ends of mosses and falling into tranquil pools.

The ouzel never sings in chorus with other birds, nor with his kind, but only with the streams. And like flowers that bloom beneath the surface of the ground, some of our favorite's best song-blossoms never rise above the surface of the heavier music of the water. I have often observed him singing in the midst of beaten

spray, his music completely buried beneath the water's roar; yet I knew he was surely singing by his gestures and the movements of his bill.

His food, as far as I have noticed, consists of all kinds of water insects, which in summer are chiefly procured along shallow margins. Here he wades about ducking his head under water and deftly turning over pebbles and fallen leaves with his bill, seldom choosing to go into deep water where he has to use his wings in diving.

He seems to be especially fond of the larvæ of mosquitoes, found in abundance attached to the bottom of smooth rock channels where the current is shallow. When feeding in such places he wades upstream, and often while his head is under water the swift current is deflected upward along the glossy curves of his neck and shoulders, in the form of a clear, crystalline shell, which fairly incloses him like a bell-glass, the shell being broken and re-formed as he lifts and dips his head; while ever and anon he sidles out to where the too powerful current carries him off his feet; then he dexterously rises on the wing and goes gleaning again in shallower places.

But during the winter, when the stream banks are embossed in snow, and the streams themselves are chilled nearly to the freezing-

point, so that the snow falling into them in stormy weather is not wholly dissolved, but forms a thin, blue sludge, thus rendering the current opaque — then he seeks the deeper portions of the main rivers, where he may dive to clear water beneath the sludge. Or he repairs to some open lake or millpond, at the bottom of which he feeds in safety.

When thus compelled to betake himself to a lake, he does not plunge into it at once like a duck, but always alights in the first place upon some rock or fallen pine along the shore. Then flying out thirty or forty yards, more or less, according to the character of the bottom, he alights with a dainty glint on the surface, swims about, looks down, finally makes up his mind, and disappears with a sharp stroke of his wings. After feeding for two or three minutes, he suddenly reappears, showers the water from his wings with one vigorous shake, and rises abruptly into the air as if pushed up from beneath, comes back to his perch, sings a few minutes, and goes out to dive again; thus coming and going, singing and diving at the same place for hours.

The ouzel is usually found singly; rarely in pairs, excepting during the breeding-season, and *very* rarely in threes or fours. I once observed three thus spending a winter morning in

company, upon a small glacier lake, on the Upper Merced, about seventy-five hundred feet above the level of the sea. A storm had occurred during the night, but the morning sun shone unclouded, and the shadowy lake, gleaming darkly in its setting of fresh snow, lay smooth and motionless as a mirror. My camp chanced to be within a few feet of the water's edge, opposite a fallen pine, some of the branches of which leaned out over the lake. Here my three dearly welcome visitors took up their station, and at once began to embroider the frosty air with their delicious melody, doubly delightful to me that particular morning, as I had been somewhat apprehensive of danger in breaking my way down through the snow-choked cañons to the lowlands.

The portion of the lake bottom selected for a feeding-ground lies at a depth of fifteen or twenty feet below the surface, and is covered with a short growth of algæ and other aquatic plants, — facts I had previously determined while sailing over it on a raft. After alighting on the glassy surface, they occasionally indulged in a little play, chasing one another round about in small circles; then all three would suddenly dive together, and then come ashore and sing.

The ouzel seldom swims more than a few

yards on the surface, for, not being web-footed, he makes rather slow progress, but by means of his strong, crisp wings he swims, or rather flies, with celerity under the surface, often to considerable distances. But it is in withstanding the force of heavy rapids that his strength of wing in this respect is most strikingly manifested. The following may be regarded as a fair illustration of his power of sub-aquatic flight. One stormy morning in winter when the Merced River was blue and green with unmelted snow, I observed one of my ouzels perched on a snag out in the midst of a swift-rushing rapid, singing cheerily, as if everything was just to his mind; and while I stood on the bank admiring him, he suddenly plunged into the sludgy current, leaving his song abruptly broken off. After feeding a minute or two at the bottom, and when one would suppose that he must inevitably be swept far downstream, he emerged just where he went down, alighted on the same snag, showered the water beads from his feathers, and continued his unfinished song, seemingly in tranquil ease as if it had suffered no interruption.

The ouzel alone of all birds dares to enter a white torrent. And though strictly terrestrial in structure, no other is so inseparably related to water, not even the duck, or the bold ocean

albatross, or the stormy petrel. For ducks go ashore as soon as they finish feeding in undisturbed places, and very often make long flights overland from lake to lake or field to field. The same is true of most other aquatic birds. But the ouzel, born on the brink of a stream, or on a snag or boulder in the midst of it, seldom leaves it for a single moment. For, notwithstanding he is often on the wing, he never flies overland, but whirs with rapid, quail-like beat above the stream, tracing all its windings. Even when the stream is quite small, say from five to ten feet wide, he seldom shortens his flight by crossing a bend, however abrupt it may be; and even when disturbed by meeting some one on the bank, he prefers to fly over one's head, to dodging out over the ground. When, therefore, his flight along a crooked stream is viewed endwise, it appears most strikingly wavered — a description on the air of every curve with lightning-like rapidity.

The vertical curves and angles of the most precipitous torrents he traces with the same rigid fidelity, swooping down the inclines of cascades, dropping sheer over dizzy falls amid the spray, and ascending with the same fearlessness and ease, seldom seeking to lessen the steepness of the acclivity by beginning to ascend before reaching the base of the fall. No

matter though it may be several hundred feet in height he holds straight on, as if about to dash headlong into the throng of booming rockets, then darts abruptly upward, and, after alighting at the top of the precipice to rest a moment, proceeds to feed and sing. His flight is solid and impetuous, without any intermission of wing-beats, — one homogeneous buzz like that of a laden bee on its way home. And while thus buzzing freely from fall to fall, he is frequently heard giving utterance to a long outdrawn train of unmodulated notes, in no way connected with his song, but corresponding closely with his flight in sustained vigor.

Were the flights of all the ouzels in the Sierra traced on a chart, they would indicate the direction of the flow of the entire system of ancient glaciers, from about the period of the breaking up of the ice sheet until near the close of the glacial winter; because the streams which the ouzels so rigidly follow are, with the unimportant exceptions of a few side tributaries, all flowing in channels eroded for them out of the solid flank of the range by the vanished glaciers, — the streams tracing the ancient glaciers, the ouzels tracing the streams. Nor do we find so complete compliance to glacial conditions in the life of any other mountain bird, or animal

of any kind. Bears frequently accept the pathways laid down by glaciers as the easiest to travel; but they often leave them and cross over from cañon to cañon. So also, most of the birds trace the moraines to some extent, because the forests are growing on them. But they wander far, crossing the cañons from grove to grove, and draw exceedingly angular and complicated courses.

The ouzel's nest is one of the most extraordinary pieces of bird architecture I ever saw, odd and novel in design, perfectly fresh and beautiful, and in every way worthy of the genius of the little builder. It is about a foot in diameter, round and bossy in outline, with a neatly arched opening near the bottom, somewhat like an old-fashioned brick oven, or Hottentot's hut. It is built almost exclusively of green and yellow mosses, chiefly the beautiful fronded hypnum that covers the rocks and old drift-logs in the vicinity of waterfalls. These are deftly interwoven, and felted together into a charming little hut; and so situated that many of the outer mosses continue to flourish as if they had not been plucked. A few fine, silky-stemmed grasses are occasionally found interwoven with the mosses, but, with the exception of a thin layer lining the floor, their presence seems accidental, as they are of a species found

growing with the mosses and are probably plucked with them. The site chosen for this curious mansion is usually some little rock shelf within reach of the lighter particles of the spray of a waterfall, so that its walls are kept green and growing, at least during the time of high water.

No harsh lines are presented by any portion of the nest as seen in place, but when removed from its shelf, the back and bottom, and sometimes a portion of the top, is found quite sharply angular, because it is made to conform to the surface of the rock upon which and against which it is built, the little architect always taking advantage of slight crevices and protuberances that may chance to offer, to render his structure stable by means of a kind of gripping and dovetailing.

In choosing a building-spot, concealment does not seem to be taken into consideration; yet notwithstanding the nest is large and guilelessly exposed to view, it is far from being easily detected, chiefly because it swells forward like any other bulging moss cushion growing naturally in such situations. This is more especially the case where the nest is kept fresh by being well sprinkled. Sometimes these romantic little huts have their beauty enhanced by rock ferns and grasses that spring up around the mossy

walls, or in front of the doorsill, dripping with crystal beads.

Furthermore, at certain hours of the day, when the sunshine is poured down at the required angle, the whole mass of the spray enveloping the fairy establishment is brilliantly irised; and it is through so glorious a rainbow atmosphere as this that some of our blessed ouzels obtain their first peep at the world.

Ouzels seem so completely part and parcel of the streams they inhabit, they scarce suggest any other origin than the streams themselves; and one might almost be pardoned in fancying they come direct from the living waters, like flowers from the ground. At least, from whatever cause, it never occurred to me to look for their nests until more than a year after I had made the acquaintance of the birds themselves, although I found one the very day on which I began the search. In making my way from Yosemite to the glaciers at the heads of the Merced and Tuolumne Rivers, I camped in a particularly wild and romantic portion of the Nevada cañon where in previous excursions I had never failed to enjoy the company of my favorites, who were attracted here, no doubt, by the safe nesting-places in the shelving rocks, and by the abundance of food and falling water. The river, for miles above and below, consists

of a succession of small falls from ten to sixty feet in height, connected by flat, plume-like cascades that go flashing from fall to fall, free and almost channelless, over waving folds of glacier-polished granite.

On the south side of one of the falls, that portion of the precipice bathed by the spray presents a series of little shelves and tablets caused by the development of planes of cleavage in the granite, and by the consequent fall of masses through the action of the water. "Now, here," said I, "of all places, is the most charming spot for an ouzel's nest." Then carefully scanning the fretted face of the precipice through the spray, I at length noticed a yellowish moss cushion, growing on the edge of a level tablet within five or six feet of the outer folds of the fall. But apart from the fact of its being situated where one acquainted with the lives of ouzels would fancy an ouzel's nest ought to be, there was nothing in its appearance visible at first sight, to distinguish it from other bosses of rock-moss similarly situated with reference to perennial spray; and it was not until I had scrutinized it again and again, and had removed my shoes and stockings and crept along the face of the rock within eight or ten feet of it, that I could decide certainly whether it was a nest or a natural growth.

In these moss huts three or four eggs are laid, white like foam bubbles; and well may the little birds hatched from them sing water songs, for they hear them all their lives, and even before they are born.

I have often observed the young just out of the nest making their odd gestures, and seeming in every way as much at home as their experienced parents, like young bees on their first excursions to the flower fields. No amount of familiarity with people and their ways seems to change them in the least. To all appearance their behavior is just the same on seeing a man for the first time, as when they have seen him frequently.

On the lower reaches of the rivers where mills are built, they sing on through the din of the machinery, and all the noisy confusion of dogs, cattle, and workmen. On one occasion, while a wood-chopper was at work on the river-bank, I observed one cheerily singing within reach of the flying chips. Nor does any kind of unwonted disturbance put him in bad humor, or frighten him out of calm self-possession. In passing through a narrow gorge, I once drove one ahead of me from rapid to rapid, disturbing him four times in quick succession where he could not very well fly past me on account of the narrowness of the channel. Most birds under

similar circumstances fancy themselves pursued, and become suspiciously uneasy; but, instead of growing nervous about it, he made his usual dippings, and sang one of his most tranquil strains. When observed within a few yards their eyes are seen to express remarkable gentleness and intelligence; but they seldom allow so near a view unless one wears clothing of about the same color as the rocks and trees, and knows how to sit still. On one occasion, while rambling along the shore of a mountain lake, where the birds, at least those born that season, had never seen a man, I sat down to rest on a large stone close to the water's edge, upon which it seemed the ouzels and sandpipers were in the habit of alighting when they came to feed on that part of the shore, and some of the other birds also, when they came down to wash or drink. In a few minutes, along came a whirring ouzel and alighted on the stone beside me, within reach of my hand. Then suddenly observing me, he stooped nervously as if about to fly on the instant, but as I remained as motionless as the stone, he gained confidence, and looked me steadily in the face for about a minute, then flew quietly to the outlet and began to sing. Next came a sandpiper and gazed at me with much the same guileless expression of eye as the ouzel. Lastly, down with a swoop

came a Steller's jay out of a fir tree, probably with the intention of moistening his noisy throat. But instead of sitting confidingly as my other visitors had done, he rushed off at once, nearly tumbling heels over head into the lake in his suspicious confusion, and with loud screams roused the neighborhood.

Love for song birds, with their sweet human voices, appears to be more common and unfailing than love for flowers. Every one loves flowers to some extent, at least in life's fresh morning, attracted by them as instinctively as hummingbirds and bees. Even the young Digger Indians have sufficient love for the brightest of those found growing on the mountains to gather them and braid them as decorations for the hair. And I was glad to discover, through the few Indians that could be induced to talk on the subject, that they have names for the wild rose and the lily, and other conspicuous flowers, whether available as food or otherwise. Most men, however, whether savage or civilized, become apathetic toward all plants that have no other apparent use than the use of beauty. But fortunately one's first instinctive love of song-birds is never wholly obliterated, no matter what the influences upon our lives may be. I have often been delighted to see a pure, spiritual glow come into the countenances of

hard business men and old miners, when a song-bird chanced to alight near them. Nevertheless, the little mouthful of meat that swells out the breasts of some song-birds is too often the cause of their death. Larks and robins in particular are brought to market in hundreds. But fortunately the ouzel has no enemy so eager to eat his little body as to follow him into the mountain solitudes. I never knew him to be chased even by hawks.

An acquaintance of mine, a sort of foothill mountaineer, had a pet cat, a great, dozy, overgrown creature, about as broad-shouldered as a lynx. During the winter, while the snow lay deep, the mountaineer sat in his lonely cabin among the pines smoking his pipe and wearing the dull time away. Tom was his sole companion, sharing his bed, and sitting beside him on a stool with much the same drowsy expression of eye as his master. The good-natured bachelor was content with his hard fare of soda bread and bacon, but Tom, the only creature in the world acknowledging dependence on him, must needs be provided with fresh meat. Accordingly he bestirred himself to contrive squirrel traps, and waded the snowy woods with his gun, making sad havoc among the few winter birds, sparing neither robin, sparrow, nor tiny nuthatch, and the pleasure of

seeing Tom eat and grow fat was his great reward.

One cold afternoon, while hunting along the river-bank, he noticed a plain-feathered little bird skipping about in the shallows, and immediately raised his gun. But just then the confiding songster began to sing, and after listening to his summery melody the charmed hunter turned away, saying, "Bless your little heart, I can't shoot you, not even for Tom."

Even so far north as icy Alaska, I have found my glad singer. When I was exploring the glaciers between Mount Fairweather and the Stickeen River, one cold day in November, after trying in vain to force a way through the innumerable icebergs of Sum Dum Bay to the great glaciers at the head of it, I was weary and baffled and sat resting in my canoe convinced at last that I would have to leave this part of my work for another year. Then I began to plan my escape to open water before the young ice which was beginning to form should shut me in. While I thus lingered drifting with the bergs, in the midst of these gloomy forebodings and all the terrible glacial desolation and grandeur, I suddenly heard the well-known whir of an ouzel's wings, and, looking up, saw my little comforter coming straight across the ice from the shore. In a second or two he was

with me, flying three times round my head with a happy salute, as if saying, "Cheer up, old friend; you see I'm here, and all's well." Then he flew back to the shore, alighted on the topmost jag of a stranded iceberg, and began to nod and bow as though he were on one of his favorite boulders in the midst of a sunny Sierra cascade.

The species is distributed all along the mountain-ranges of the Pacific Coast from Alaska to Mexico, and east to the Rocky Mountains. Nevertheless, it is as yet comparatively little known. Audubon and Wilson did not meet it. Swainson was, I believe, the first naturalist to describe a specimen from Mexico. Specimens were shortly afterward procured by Drummond near the sources of the Athabasca River, between the fifty-fourth and fifty-sixth parallels; and it has been collected by nearly all of the numerous exploring expeditions undertaken of late through our Western States and Territories; for it never fails to engage the attention of naturalists in a very particular manner.

Such, then, is our little cinclus, beloved of every one who is so fortunate as to know him. Tracing on strong wing every curve of the most precipitous torrents from one extremity of the Sierra to the other; not fearing to follow them

through their darkest gorges and coldest snow-tunnels; acquainted with every waterfall, echoing their divine music; and throughout the whole of their beautiful lives interpreting all that we in our unbelief call terrible in the utterances of torrents and storms, as only varied expressions of God's eternal love.

CHAPTER XIV

THE WILD SHEEP
(Ovis montana)

THE wild sheep ranks highest among the animal mountaineers of the Sierra. Possessed of keen sight and scent, and strong limbs, he dwells secure amid the loftiest summits, leaping unscathed from crag to crag, up and down the fronts of giddy precipices, crossing foaming torrents and slopes of frozen snow, exposed to the wildest storms, yet maintaining a brave, warm life, and developing from generation to generation in perfect strength and beauty.

Nearly all the lofty mountain-chains of the globe are inhabited by wild sheep, most of which, on account of the remote and all but inaccessible regions where they dwell, are imperfectly known as yet. They are classified by different naturalists under from five to ten distinct species or varieties, the best known being the burrhel of the Himalaya (*Ovis burrhel*, Blyth); the argali, the large wild sheep of central and northeastern Asia (*O. ammon*, Linn., or *Caprovis argali*); the Corsican mouflon (*O. musimon*, Pal.); the aoudad of the mountains of northern Africa (*Ammotragus tragelaphus*);

and the Rocky mountain bighorn (*O. montana*, Cuv.). To this last-named species belongs the wild sheep of the Sierra. Its range, according to the late Professor Baird, of the Smithsonian Institution, extends "from the region of the upper Missouri and Yellowstone to the Rocky Mountains and the high grounds adjacent to them on the eastern slope, and as far south as the Rio Grande. Westward it extends to the coast ranges of Washington, Oregon, and California, and follows the highlands some distance into Mexico." [1] Throughout the vast region bounded on the east by the Wahsatch Mountains and on the west by the Sierra there are more than a hundred subordinate ranges and mountain groups, trending north and south, range beyond range, with summits rising from eight to twelve thousand feet above the level of the sea, probably all of which, according to my own observations, is, or has been, inhabited by this species.

Compared with the argali, which, considering its size and the vast extent of its range, is probably the most important of all the wild sheep, our species is about the same size, but the horns are less twisted and less divergent. The more important characteristics are, however, essentially the same, some of the best

[1] *Pacific Railroad Survey*, vol. VIII, p. 678.

naturalists maintaining that the two are only varied forms of one species. In accordance with this view, Cuvier conjectures that since central Asia seems to be the region where the sheep first appeared, and from which it has been distributed, the argali may have been distributed over this continent from Asia by crossing Bering Strait on ice. This conjecture is not so ill founded as at first sight would appear; for the Strait is only about fifty miles wide, is interrupted by three islands, and is jammed with ice nearly every winter. Furthermore the argali is abundant on the mountains adjacent to the Strait at East Cape, where it is well known to the Tschuckchi hunters and where I have seen many of their horns.

On account of the extreme variability of the sheep under culture, it is generally supposed that the innumerable domestic breeds have all been derived from the few wild species; but the whole question is involved in obscurity. According to Darwin, sheep have been domesticated from a very ancient period, the remains of a small breed, differing from any now known, having been found in the famous Swiss lake dwellings.

Compared with the best-known domestic breeds, we find that our wild species is much larger, and, instead of an all-wool garment,

wears a thick overcoat of hair like that of the deer, and an undercovering of fine wool. The hair, though rather coarse, is comfortably soft and spongy, and lies smooth, as if carefully tended with comb and brush. The predominant color during most of the year is brownish-gray, varying to bluish-gray in the autumn; the belly and a large, conspicuous patch on the buttocks are white; and the tail, which is very short, like that of a deer, is black, with a yellowish border. The wool is white, and grows in beautiful spirals down out of sight among the shining hair, like delicate climbing vines among stalks of corn.

The horns of the male are of immense size, measuring in their greater diameter from five to six and a half inches, and from two and a half to three feet in length around the curve. They are yellowish-white in color, and ridged transversely, like those of the domestic ram. Their cross-section near the base is somewhat triangular in outline, and flattened toward the tip. Rising boldly from the top of the head, they curve gently backward and outward, then forward and outward, until about three fourths of a circle is described, and until the flattened, blunt tips are about two feet or two and a half feet apart. Those of the female are flattened throughout their entire length, are less curved

than those of the male, and much smaller, measuring less than a foot along the curve.

A ram and ewe that I obtained near the Modoc lava-beds, to the northeast of Mount Shasta, measured as follows: —

	Ram.		*Ewe.*	
	ft.	*in.*	*ft.*	*in.*
Height at shoulders	3	6	3	0
Girth around shoulders	3	11	3	3¾
Length from nose to root of tail	5	10¼	4	3½
Length of ears	0	4¾	0	5
Length of tail	0	4½	0	4½
Length of horns around curve	2	9	0	11½
Distance across from tip to tip of horns	2	5½		
Circumference of horns at base	1	4	0	6

The measurements of a male obtained in the Rocky Mountains by Audubon vary but little as compared with the above. The weight of his specimen was three hundred and forty-four pounds,[1] which is, perhaps, about an average for full-grown males. The females are about a third lighter.

Besides these differences in size, color, hair, etc., as noted above, we may observe that the domestic sheep, in a general way, is expressionless, like a dull bundle of something only half alive, while the wild is as elegant and graceful as a deer, every movement manifesting admirable strength and character. The tame is timid; the wild is bold. The tame is always more or

[1] Audubon and Bachman's *Quadrupeds of North America.*

less ruffled and dirty; while the wild is as smooth and clean as the flowers of his mountain pastures.

The earliest mention that I have been able to find of the wild sheep in America is by Father Picolo, a Catholic missionary at Monterey, in the year 1797, who, after describing it, oddly enough, as "a kind of deer with a sheep-like head, and about as large as a calf one or two years old," naturally hurries on to remark: "I have eaten of these beasts; their flesh is very tender and delicious." Mackenzie, in his northern travels, heard the species spoken of by the Indians as "white buffaloes." And Lewis and Clark tell us that, in a time of great scarcity on the head waters of the Missouri, they saw plenty of wild sheep, but they were "too shy to be shot."

A few of the more energetic of the Pah Ute Indians hunt the wild sheep every season among the more accessible sections of the High Sierra, in the neighborhood of passes, where, from having been pursued, they have become extremely wary; but in the rugged wilderness of peaks and cañons, where the foaming tributaries of the San Joaquin and King's Rivers take their rise, they fear no hunter save the wolf, and are more guileless and approachable than their tame kindred.

While engaged in the work of exploring high regions where they delight to roam I have been greatly interested in studying their habits. In the months of November and December, and probably during a considerable portion of mid-winter, they all flock together, male and female, old and young. I once found a complete band of this kind numbering upward of fifty, which, on being alarmed, went bounding away across a jagged lava-bed at admirable speed, led by a majestic old ram, with the lambs safe in the middle of the flock.

In spring and summer, the full-grown rams form separate bands of from three to twenty, and are usually found feeding along the edges of glacier meadows, or resting among the castle-like crags of the high summits; and whether quietly feeding, or scaling the wild cliffs, their noble forms and the power and beauty of their movements never fail to strike the beholder with lively admiration.

Their resting-places seem to be chosen with reference to sunshine and a wide outlook, and most of all to safety. Their feeding-grounds are among the most beautiful of the wild gardens, bright with daisies and gentians and mats of purple bryanthus, lying hidden away on rocky headlands and cañon sides, where sunshine is abundant, or down in the shady glacier valleys,

along the banks of the streams and lakes, where the plushy sod is greenest. Here they feast all summer, the happy wanderers, perhaps relishing the beauty as well as the taste of the lovely flora on which they feed.

When the winter storms set in, loading their highland pastures with snow, then, like the birds, they gather and go to lower climates, usually descending the eastern flank of the range to the rough, volcanic tablelands and treeless ranges of the Great Basin adjacent to the Sierra. They never make haste, however, and seem to have no dread of storms, many of the strongest only going down leisurely to bare, wind-swept ridges, to feed on bushes and dry bunch-grass, and then returning up into the snow. Once I was snow-bound on Mount Shasta for three days, a little below the timber line. It was a dark and stormy time, well calculated to test the skill and endurance of mountaineers. The snow-laden gale drove on night and day in hissing, blinding floods, and when at length it began to abate, I found that a small band of wild sheep had weathered the storm in the lee of a clump of dwarf pines a few yards above my storm-nest, where the snow was eight or ten feet deep. I was warm back of a rock, with blankets, bread, and fire. My brave companions lay in the snow, without food, and

with only the partial shelter of the short trees, yet they made no sign of suffering or faint-heartedness.

In the months of May and June, the wild sheep bring forth their young in solitary and almost inaccessible crags, far above the nesting-rocks of the eagle. I have frequently come upon the beds of the ewes and lambs at an elevation of from twelve to thirteen thousand feet above sea-level. These beds are simply oval-shaped hollows, pawed out among loose, disintegrating rock-chips and sand, upon some sunny spot commanding a good outlook, and partially sheltered from the winds that sweep those lofty peaks almost without intermission. Such is the cradle of the little mountaineer, aloft in the very sky; rocked in storms, curtained in clouds, sleeping in thin, icy air; but, wrapped in his hairy coat, and nourished by a strong, warm mother, defended from the talons of the eagle and the teeth of the sly coyote, the bonny lamb grows apace. He soon learns to nibble the tufted rock grasses and leaves of the white spiræa; his horns begin to shoot, and before summer is done he is strong and agile, and goes forth with the flock, watched by the same divine love that tends the more helpless human lamb in its cradle by the fireside.

Nothing is more commonly remarked by

noisy, dusty trail travelers in the Sierra than the want of animal life — no song-birds, no deer, no squirrels, no game of any kind, they say. But if such could only go away quietly into the wilderness, sauntering afoot and alone with natural deliberation, they would soon learn that these mountain mansions are not without inhabitants, many of whom, confiding and gentle, would not try to shun their acquaintance.

In the fall of 1873 I was tracing the South Fork of the San Joaquin up its wild cañon to its farthest glacier fountains. It was the season of alpine Indian summer. The sun beamed lovingly; the squirrels were nutting in the pine trees, butterflies hovered about the last of the goldenrods, the willow and maple thickets were yellow, the meadows brown, and the whole sunny, mellow landscape glowed like a countenance in the deepest and sweetest repose. On my way over the glacier-polished rocks along the river, I came to an expanded portion of the cañon, about two miles long and half a mile wide, which formed a level park inclosed with picturesque granite walls like those of Yosemite Valley. Down through the middle of it poured the beautiful river shining and spangling in the golden light, yellow groves on its banks, and strips of brown meadow; while the

whole park was astir with wild life, some of which even the noisiest and least observing of travelers must have seen had they been with me. Deer, with their supple, well-grown fawns, bounded from thicket to thicket as I advanced; grouse kept rising from the brown grass with a great whirring of wings, and, alighting on the lower branches of the pines and poplars, allowed a near approach, as if curious to see me. Farther on, a broad-shouldered wildcat showed himself, coming out of a grove, and crossing the river on flood jamb of logs, halting for a moment to look back. The bird-like tamias frisked about my feet everywhere among the pine needles and seedy grass tufts; cranes waded the shallows of the river bends, the kingfisher rattled from perch to perch, and the blessed ouzel sang amid the spray of every cascade. Where may lonely wanderer find a more interesting family of mountain dwellers, earth-born companions and fellow mortals? It was afternoon when I joined them, and the glorious landscape began to fade in the gloaming before I awoke from their enchantment. Then I sought a camp-ground on the river-bank, made a cupful of tea, and lay down to sleep on a smooth place among the yellow leaves of an aspen grove. Next day I discovered yet grander landscapes and grander life. Follow-

ing the river over huge, swelling rock bosses through a majestic cañon, and past innumerable cascades, the scenery in general became gradually wilder and more alpine. The sugar pine and silver firs gave place to the hardier cedar and hemlock spruce. The cañon walls became more rugged and bare, and gentians and arctic daisies became more abundant in the gardens and strips of meadow along the streams. Toward the middle of the afternoon I came to another valley, strikingly wild and original in all its features, and perhaps never before touched by human foot. As regards area of level bottom-land, it is one of the very smallest of the Yosemite type, but its walls are sublime, rising to a height of from two to four thousand feet above the river. At the head of the valley the main cañon forks, as is found to be the case in all yosemites. The formation of this one is due chiefly to the action of two great glaciers, whose fountains lay to the eastward, on the flanks of Mounts Humphrey and Emerson and a cluster of nameless peaks farther south.

The gray, boulder-chafed river was singing loudly through the valley, but above its massy roar I heard the booming of a waterfall, which drew me eagerly on; and just as I emerged from the tangled groves and brier thickets at the

head of the valley, the main fork of the river came in sight, falling fresh from its glacier fountains in a snowy cascade, between granite walls two thousand feet high. The steep incline down which the glad waters thundered seemed to bar all farther progress. It was not long, however, before I discovered a crooked seam in the rock, by which I was enabled to climb to the edge of a terrace that crosses the cañon, and divides the cataract nearly in the middle. Here I sat down to take breath and make some entries in my notebook, taking advantage, at the same time, of my elevated position above the trees to gaze back over the valley into the heart of the noble landscape, little knowing the while what neighbors were near.

After spending a few minutes in this way, I chanced to look across the fall, and there stood three sheep quietly observing me. Never did the sudden appearance of a mountain, or fall, or human friend more forcibly seize and rivet my attention. Anxiety to observe accurately held me perfectly still. Eagerly I marked the flowing undulations of their firm, braided muscles, their strong legs, ears, eyes, heads, their graceful rounded necks, the color of their hair, and the bold, upsweeping curves of their noble horns. When they moved I watched every gesture, while they, in no wise discon-

certed either by my attention or by the tumultuous roar of the water, advanced deliberately alongside the rapids, between the two divisions of the cataract, turning now and then to look at me. Presently they came to a steep, ice-burnished acclivity, which they ascended by a succession of quick, short, stiff-legged leaps, reaching the top without a struggle. This was the most startling feat of mountaineering I had ever witnessed, and, considering only the mechanics of the thing, my astonishment could hardly have been greater had they displayed wings and taken to flight. "Sure-footed" mules on such ground would have fallen and rolled like loosened boulders. Many a time, where the slopes are far lower, I have been compelled to take off my shoes and stockings, tie them to my belt, and creep barefooted, with the utmost caution. No wonder, then, that I watched the progress of these animal mountaineers with keen sympathy, and exulted in the boundless sufficiency of wild nature displayed in their invention, construction, and keeping. A few minutes later I caught sight of a dozen more in one band, near the foot of the upper fall. They were standing on the same side of the river with me, only twenty-five or thirty yards away, looking as unworn and perfect as if created on the spot. It appeared by

their tracks, which I had seen in the Little Yosemite, and by their present position, that when I came up the cañon they were all feeding together down in the valley, and in their haste to reach high ground, where they could look about them to ascertain the nature of the strange disturbance, they were divided, three ascending on one side the river, the rest on the other. The main band, headed by an experienced chief, now began to cross the wild rapids between the two divisions of the cascade. This was another exciting feat; for, among all the varied experiences of mountaineers, the crossing of boisterous, rock-dashed torrents is found to be one of the most trying to the nerves. Yet these fine fellows walked fearlessly to the brink, and jumped from boulder to boulder, holding themselves in easy poise above the whirling, confusing current, as if they were doing nothing extraordinary.

In the immediate foreground of this rare picture there was a fold of ice-burnished granite, traversed by a few bold lines in which rock ferns and tufts of bryanthus were growing, the gray cañon walls on the sides, nobly sculptured and adorned with brown cedars and pines; lofty peaks in the distance, and in the middle ground the snowy fall, the voice and soul of the landscape; fringing bushes beating time to its thun-

der-tones, the brave sheep in front of it, their gray forms slightly obscured in the spray, yet standing out in good, heavy relief against the close white water, with their huge horns rising like the upturned roots of dead pine trees, while the evening sunbeams streaming up the cañon colored all the picture a rosy purple and made it glorious. After crossing the river, the dauntless climbers, led by their chief, at once began to scale the cañon wall, turning now right, now left, in long, single file, keeping well apart out of one another's way, and leaping in regular succession from crag to crag, now ascending slippery dome curves, now walking leisurely along the edges of precipices, stopping at times to gaze down at me from some flat-topped rock, with heads held aslant, as if curious to learn what I thought about it, or whether I was likely to follow them. After reaching the top of the wall, which, at this place, is somewhere between fifteen hundred and two thousand feet high, they were still visible against the sky as they lingered, looking down in groups of twos or threes.

Throughout the entire ascent they did not make a single awkward step, or an unsuccessful effort of any kind. I have frequently seen tame sheep in mountains jump upon a sloping rock surface, hold on tremulously a few seconds,

and fall back baffled and irresolute. But in the most trying situations, where the slightest want or inaccuracy would have been fatal, these always seemed to move in comfortable reliance on their strength and skill, the limits of which they never appeared to know. Moreover, each one of the flock, while following the guidance of the most experienced, yet climbed with intelligent independence as a perfect individual, capable of separate existence whenever it should wish or be compelled to withdraw from the little clan. The domestic sheep, on the contrary, is only a fraction of an animal, a whole flock being required to form an individual, just as numerous flowerets are required to make one complete sunflower.

Those shepherds who, in summer, drive their flocks to the mountain pastures, and, while watching them night and day, have seen them frightened by bears and storms, and scattered like wind-driven chaff, will, in some measure, be able to appreciate the self-reliance and strength and noble individuality of Nature's sheep.

Like the Alp-climbing ibex of Europe, our mountaineer is said to plunge headlong down the faces of sheer precipices, and alight on his big horns. I know only two hunters who claim to have actually witnessed this feat; I never

was so fortunate. They describe the act as a diving head foremost. The horns are so large at the base that they cover the upper portion of the head down nearly to a level with the eyes, and the skull is exceedingly strong. I struck an old, bleached specimen on Mount Ritter a dozen blows with my ice-axe without breaking it. Such skulls would not fracture very readily by the wildest rock-diving, but other bones could hardly be expected to hold together in such a performance; and the mechanical difficulties in the way of controlling their movements, after striking upon an irregular surface, are, in themselves, sufficient to show this boulder-like method of progression to be impossible, even in the absence of all other evidence on the subject; moreover, the ewes follow wherever the rams may lead, although their horns are mere spikes. I have found many pairs of the horns of the old rams considerably battered, doubtless a result of fighting. I was particularly interested in the question, after witnessing the performances of this San Joaquin band upon the glaciated rocks at the foot of the falls; and as soon as I procured specimens and examined their feet, all the mystery disappeared. The secret, considered in connection with exceptionally strong muscles, is simply this: the wide posterior por-

tion of the bottom of the foot, instead of wearing down and becoming flat and hard, like the feet of tame sheep and horses, bulges out in a soft, rubber-like pad or cushion, which not only grips and holds well on smooth rocks, but fits into small cavities, and down upon or against slight protuberances. Even the hardest portions of the edge of the hoof are comparatively soft and elastic; furthermore, the toes admit of an extraordinary amount of both lateral and vertical movement, allowing the foot to accommodate itself still more perfectly to the irregularities of rock surfaces, while at the same time increasing the gripping power.

At the base of Sheep Rock, one of the winter strongholds of the Shasta flocks, there lives a stock-raiser who has had the advantage of observing the movements of wild sheep every winter; and, in the course of a conversation with him on the subject of their diving habits, he pointed to the front of a lava headland about one hundred and fifty feet high, which is only eight or ten degrees out of the perpendicular. "There," said he, "I followed a band of them fellows to the back of that rock yonder, and expected to capture them all, for I thought I had a dead thing on them. I got behind them on a narrow bench that runs along the face of the wall near the top and comes to an end where

they could n't get away without falling and being killed; but they jumped off, and landed all right, as if that were the regular thing with them."

"What!" said I, "jumped one hundred and fifty feet perpendicular! Did you see them do it?"

"No," he replied, "I did n't see them going down, for I was behind them; but I saw them go off over the brink, and then I went below and found their tracks where they struck on the loose rubbish at the bottom. They just *sailed right off*, and landed on their feet right side up. That is the kind of animal *they* is — beats anything else that goes on four legs."

On another occasion, a flock that was pursued by hunters retreated to another portion of this same cliff where it is still higher, and, on being followed, they were seen jumping down in perfect order, one behind another, by two men who happened to be chopping where they had a fair view of them and could watch their progress from top to bottom of the precipice. Both ewes and rams made the frightful descent without evincing any extraordinary concern, hugging the rock closely, and controlling the velocity of their half-falling, half-leaping movements by striking at short intervals and holding back with their cushioned, rubber feet upon

small ledges and roughened inclines until near the bottom, when they "sailed off" into the free air and alighted on their feet, but with their bodies so nearly in a vertical position that they appeared to be diving.

It appears, therefore, that the methods of this wild mountaineering become clearly comprehensible as soon as we make ourselves acquainted with the rocks, and the kind of feet and muscles brought to bear upon them.

The Modoc and Pah Ute Indians are, or rather have been, the most successful hunters of the wild sheep in the regions that have come under my own observation. I have seen large numbers of heads and horns in the caves of Mount Shasta and the Modoc lava-beds, where the Indians had been feasting in stormy weather; also in the cañons of the Sierra opposite Owen's Valley; while the heavy obsidian arrow-heads found on some of the highest peaks show that this warfare has long been going on.

In the more accessible ranges that stretch across the desert regions of western Utah and Nevada, considerable numbers of Indians used to hunt in company like packs of wolves, and being perfectly acquainted with the topography of their hunting-grounds, and with the habits and instincts of the game, they were pretty

successful. On the tops of nearly every one of the Nevada mountains that I have visited, I found small, nest-like inclosures built of stones, in which, as I afterward learned, one or more Indians would lie in wait while their companions scoured the ridges below, knowing that the alarmed sheep would surely run to the summit, and when they could be made to approach with the wind they were shot at short range.

Still larger bands of Indians used to make extensive hunts upon some dominant mountain much frequented by the sheep, such as Mount Grant on the Wassuck Range to the west of Walker Lake. On some particular spot, favorably situated with reference to the well-known trails of the sheep, they built a high-walled corral, with long guiding wings diverging from the gateway; and into this inclosure they sometimes succeeded in driving the noble game. Great numbers of Indians were of course required, more, indeed, than they could usually muster, counting in squaws, children, and all; they were compelled, therefore, to build rows of dummy hunters out of stones, along the ridge-tops which they wished to prevent the sheep from crossing. And, without discrediting the sagacity of the game, these dummies were found effective; for, with a few live Indians moving about excitedly among

them, they could hardly be distinguished at a little distance from men, by any one not in the secret. The whole ridge-top then seemed to be alive with hunters.

The only animal that may fairly be regarded as a companion or rival of the sheep is the so-called Rocky Mountain goat (*Aplocerus montana*, Rich.), which, as its name indicates, is more antelope than goat. He, too, is a brave and hardy climber, fearlessly crossing the wildest summits, and braving the severest storms, but he is shaggy, short-legged, and much less dignified in demeanor then the sheep. His jet-black horns are only about five or six inches in length, and the long, white hair with which he is covered obscures the expression of his limbs. I have never yet seen a single specimen in the Sierra, though possibly a few flocks may have lived on Mount Shasta a comparatively short time ago.

The ranges of these two mountaineers are pretty distinct, and they see but little of each other; the sheep being restricted mostly to the dry, inland mountains; the goat or chamois to the wet, snowy glacier-laden mountains of the northwest coast of the continent in Oregon, Washington, British Columbia, and Alaska. Probably more than two hundred dwell on the icy, volcanic cone of Mount Rainier; and while

I was exploring the glaciers of Alaska I saw flocks of these admirable mountaineers nearly every day, and often followed their trails through the mazes of bewildering crevasses, in which they are excellent guides.

Three species of deer are found in California, — the black-tailed, white-tailed, and mule deer. The first mentioned (*Cervus Columbianus*) is by far the most abundant, and occasionally meets the sheep during the summer on high glacier meadows, and along the edge of the timber-line; but being a forest animal, seeking shelter and rearing its young in dense thickets, it seldom visits the wild sheep in its higher homes. The antelope, though not a mountaineer, is occasionally met in winter by the sheep while feeding along the edges of the sage plains and bare volcanic hills to the east of the Sierra. So also is the mule deer, which is almost restricted in its range to this eastern region. The white-tailed species belongs to the coast ranges.

Perhaps no wild animal in the world is without enemies, but highlanders, as a class, have fewer than lowlanders. The wily panther, slipping and crouching among long grass and bushes, pounces upon the antelope and deer, but seldom crosses the bald, craggy thresholds of the sheep. Neither can the bears be regarded

as enemies; for, though they seek to vary their everyday diet of nuts and berries by an occasional meal of mutton, they prefer to hunt tame and helpless flocks. Eagles and coyotes, no doubt, capture an unprotected lamb at times, or some unfortunate beset in deep, soft snow, but these cases are little more than accidents. So, also, a few perish in long-continued snowstorms, though, in all my mountaineering, I have not found more than five or six that seemed to have met their fate in this way. A little band of three were discovered snow-bound in Bloody Cañon a few years ago, and were killed with an axe by mountaineers, who chanced to be crossing the range in winter.

Man is the most dangerous enemy of all, but even from him our brave mountain dweller has little to fear in the remote solitudes of the High Sierra. The golden plains of the Sacramento and San Joaquin were lately thronged with bands of elk and antelope, but, being fertile and accessible, they were required for human pastures. So, also, are many of the feeding-grounds of the deer, — hill, valley, forest, and meadow, — but it will be long before man will care to take the highland castles of the sheep. And when we consider here how rapidly entire species of noble animals, such as the elk, moose,

and buffalo, are being pushed to the very verge of extinction, all lovers of wildness will rejoice with me in the rocky security of *Ovis montana*, the bravest of all the Sierra mountaineers.

CHAPTER XV

IN THE SIERRA FOOTHILLS

MURPHY'S CAMP is a curious old mining-town in Calaveras County, at an elevation of twenty-four hundred feet above the sea, situated like a nest in the center of a rough, gravelly region, rich in gold. Granites, slates, lavas, limestone, iron ores, quartz veins, auriferous gravels, remnants of dead fire rivers and dead water rivers are developed here side by side within a radius of a few miles, and placed invitingly open before the student like a book, while the people and the region beyond the camp furnish mines of study of never-failing interest and variety.

When I discovered this curious place, I was tracing the channels of the ancient pre-glacial rivers, instructive sections of which have been laid bare here and in the adjacent regions by the miners. Rivers, according to the poets, "go on forever"; but those of the Sierra are young as yet and have scarcely learned the way down to the sea; while at least one generation of them have died and vanished together with most of the basins they drained. All that remains of them to tell their history is a series

of interrupted fragments of channels, mostly chocked with gravel, and buried beneath broad, thick sheets of lava. These are known as the "Dead Rivers of California," and the gravel deposited in them is comprehensively called the "Blue Lead." In some places the channels of the present rivers trend in the same direction, or nearly so, as those of the ancient rivers; but, in general, there is little correspondence between them, the entire drainage having been changed, or, rather, made new. Many of the hills of the ancient landscapes have become hollows, and the old hollows have become hills. Therefore the fragmentary channels, with their loads of auriferous gravel, occur in all kinds of unthought-of places, trending obliquely, or even at right angles to the present drainage, across the tops of lofty ridges or far beneath them, presenting impressive illustrations of the magnitude of the changes accomplished since those ancient streams were annihilated. The last volcanic period preceding the regeneration of the Sierra landscapes seems to have come on over all the range almost simultaneously, like the glacial period, notwithstanding lavas of different age occur together in many places, indicating numerous periods of activity in the Sierra fire fountains. The most important of the ancient river-chan-

nels in this region is a section that extends from the south side of the town beneath Coyote Creek and the ridge beyond it to the Cañon of the Stanislaus; but on account of its depth below the general surface of the present valleys the rich gold gravels it is known to contain cannot be easily worked on a large scale. Their extraordinary richness may be inferred from the fact that many claims were profitably worked in them by sinking shafts to a depth of two hundred feet or more, and hoisting the dirt by a windlass. Should the dip of this ancient channel be such as to make the Stanislaus Cañon available as a dump, then the grand deposit might be worked by the hydraulic method, and although a long, expensive tunnel would be required, the scheme might still prove profitable, for there is "millions in it."

The importance of these ancient gravels as gold fountains is well known to miners. Even the superficial placers of the present streams have derived much of their gold from them. According to all accounts, the Murphy placers have been very rich — "terrific rich," as they say here. The hills have been cut and scalped, and every gorge and gulch and valley torn to pieces and disemboweled, expressing a fierce and desperate energy hard to understand. Still, any kind of effort-making is better than

inaction, and there is something sublime in seeing men working in dead earnest at anything, pursuing an object with glacier-like energy and persistence. Many a brave fellow has recorded a most eventful chapter of life on these Calaveras rocks. But most of the pioneer miners are sleeping now, their wild day done, while the few survivors linger languidly in the washed-out gulches or sleepy village like harried bees around the ruins of their hive. "We have no industry left *now*," they told me, "and no men; everybody and everything hereabouts has gone to decay. We are only bummers—out of the game, a thin scatterin' of poor, dilapidated cusses, compared with what we used to be in the grand old gold days. We were giants then, and you can look around here and see our tracks." But although these lingering pioneers are perhaps more exhausted than the mines, and about as dead as the dead rivers, they are yet a rare and interesting set of men, with much gold mixed with the rough, rocky gravel of their characters; and they manifest a breeding and intelligence little looked for in such surroundings as theirs. As the heavy, long-continued grinding of the glaciers brought out the features of the Sierra, so the intense experiences of the gold period have brought out the features of these old miners, forming a richness

and variety of character little known as yet. The sketches of Bret Harte, Hayes, and Miller have not exhausted this field by any means. It is interesting to note the extremes possible in one and the same character: harshness and gentleness, manliness and childishness, apathy and fierce endeavor. Men who, twenty years ago, would not cease their shoveling to save their lives, now play in the streets with children. Their long, Micawber-like waiting after the exhaustion of the placers has brought on an exaggerated form of dotage. I heard a group of brawny pioneers in the street eagerly discussing the quantity of tail needed for a boy's kite; and one graybeard undertook the sport of flying it, volunteering the information that he was a boy, "always was a boy, and d——n a man who was not a boy inside, however ancient outside!" Mines, morals, politics, the immortality of the soul, etc., were discussed beneath shade trees and in saloons, the time for each being governed apparently by the temperature. Contact with Nature, and the habits of observation acquired in gold-seeking, had made them all, to some extent, collectors, and, like wood rats, they had gathered all kinds of odd specimens into their cabins, and now required me to examine them. They were themselves the oddest and most interesting specimens.

One of them offered to show me around the old diggings, giving me fair warning before setting out that I might not like him, "because," said he, "people say I'm eccentric. I notice everything, and gather beetles and snakes and anything that's queer; and so some don't like me, and call me eccentric. I'm always trying to find out things. Now, there's a weed; the Indians eat it for greens. What do you call those long-bodied flies with big heads?" "Dragonflies," I suggested. "Well, their jaws work sidewise, instead of up and down, and grasshoppers' jaws work the same way, and therefore I think they are the same species. I always notice everything like that, and just because I do, they say I'm eccentric," etc.

Anxious that I should miss none of the wonders of their old gold-field, the good people had much to say about the marvelous beauty of Cave City Cave, and advised me to explore it. This I was very glad to do, and finding a guide who knew the way to the mouth of it, I set out from Murphy the next morning.

The most beautiful and extensive of the mountain caves of California occur in a belt of metamorphic limestone that is pretty generally developed along the western flank of the Sierra from the McCloud River on the north to the Kaweah on the south, a distance of over four

hundred miles, at an elevation of from two to seven thousand feet above the sea. Besides this regular belt of caves, the California landscapes are diversified by long imposing ranks of sea caves, rugged and variable in architecture, carved in the coast headlands and precipices by centuries of wave-dashing; and innumerable lava caves, great and small, originating in the unequal flowing and hardening of the lava sheets in which they occur, fine illustrations of which are presented in the famous Modoc lava-beds, and around the base of icy Shasta. In this comprehensive glance we may also notice the shallow wind-worn caves in stratified sandstones along the margins of the plains; and the cave-like recesses in the Sierra slates and granites, where bears and other mountaineers find shelter during the fall of sudden storms. In general, however, the grand massive uplift of the Sierra, as far as it has been laid bare to observation, is about as solid and caveless as a boulder.

Fresh beauty opens one's eyes wherever it is really seen, but the very abundance and completeness of the common beauty that besets our steps prevents its being absorbed and appreciated. It is a good thing, therefore, to make short excursions now and then to the bottom of the sea among dulse and coral, or up among the

clouds on mountain-tops, or in balloons, or even to creep like worms into dark holes and caverns underground, not only to learn something of what is going on in those out-of-the-way places, but to see better what the sun sees on our return to common everyday beauty.

Our way from Murphy's to the cave lay across a series of picturesque, moory ridges in the chaparral region between the brown foothills and the forests, a flowery stretch of rolling hill waves breaking here and there into a kind of rocky foam on the higher summits, and sinking into delightful bosky hollows embowered with vines. The day was a fine specimen of California summer, pure sunshine, unshaded most of the time by a single cloud. As the sun rose higher, the heated air began to flow in tremulous waves from every southern slope. The sea breeze that usually comes up the foothills at this season, with cooling on its wings, was scarcely perceptible. The birds were assembled beneath leafy shade, or made short, languid flights in search of food, all save the majestic buzzard; with broad wings outspread he sailed the warm air unwearily from ridge to ridge, seeming to enjoy the fervid sunshine like a butterfly. Squirrels, too, whose spicy ardor no heat or cold may abate, were nutting among the pines, and the innumerable hosts of the

insect kingdom were throbbing and wavering unwearied as sunbeams.

This brushy, berry-bearing region used to be a deer and bear pasture, but since the disturbances of the gold period these fine animals have almost wholly disappeared. Here, also, once roamed the mastodon and elephant, whose bones are found entombed in the river gravels and beneath thick folds of lava. Toward noon, as we were riding slowly over bank and brae, basking in the unfeverish sun-heat, we witnessed the upheaval of a new mountain range, a Sierra of clouds abounding in landscapes as truly sublime and beautiful — if only we have a mind to think so and eyes to see — as the more ancient rocky Sierra beneath it, with its forests and waterfalls; reminding us that, as there is a lower world of caves, so, also, there is an upper world of clouds. Huge, bossy cumuli developed with astonishing rapidity from mere buds, swelling with visible motion into colossal mountains, and piling higher, higher, in long massive ranges, peak beyond peak, dome over dome, with many a picturesque valley and shadowy cave between; while the dark firs and pines of the upper benches of the Sierra were projected against their pearl bosses with exquisite clearness of outline. These cloud mountains vanished in the azure as quickly as

they were developed, leaving no detritus; but they were not a whit less real or interesting on this account.

The more enduring hills over which we rode were vanishing as surely as they, only not so fast, a difference which is great or small according to the standpoint from which it is contemplated.

At the bottom of every dell we found little homesteads embosomed in wild brush and vines wherever the recession of the hills left patches of arable ground. These secluded flats are settled mostly by Italians and Germans, who plant a few vegetables and grapevines at odd times, while their main business is mining and prospecting. In spite of all the natural beauty of these dell cabins, they can hardly be called homes. They are only a better kind of camp, gladly abandoned whenever the hoped-for gold harvest has been gathered. There is an air of profound unrest and melancholy about the best of them. Their beauty is thrust upon them by exuberant Nature, apart from which they are only a few logs and boards rudely jointed and without ceiling or floor, a rough fireplace with corresponding cooking utensils, a shelf-bed, and stool. The ground about them is strewn with battered prospecting-pans, picks, sluice-boxes, and quartz specimens from

many a ledge, indicating the trend of their owners' hard lives.

The ride from Murphy's to the cave is scarcely two hours long, but we lingered among quartz ledges and banks of dead river gravel until long after noon. At length emerging from a narrow-throated gorge, a small house came in sight set in a thicket of fig trees at the base of a limestone hill. "That," said my guide, pointing to the house, "is Cave City, and the cave is in that gray hill." Arriving at the one house of this one-house city, we were boisterously welcomed by three drunken men who had come to town to hold a spree. The mistress of the house tried to keep order, and in reply to our inquiries told us that the cave guide was then in the cave with a party of ladies. "And must we wait until he returns?" we asked. No, that was unnecessary; we might take candles and go into the cave alone, provided we shouted from time to time so as to be found by the guide, and were careful not to fall over the rocks or into the dark pools. Accordingly, taking a trail from the house, we were led around the base of the hill to the mouth of the cave, a small inconspicuous archway, mossy around the edges and shaped like the door of a water-ouzel's nest, with no appreciable hint or advertisement of the grandeur of the many crystal

chambers within. Lighting our candles, which seemed to have no illuminating power in the thick darkness, we groped our way onward as best we could along narrow lanes and alleys, from chamber to chamber, around rustic columns and heaps of fallen rocks, stopping to rest now and then in particularly beautiful places — fairy alcoves furnished with admirable variety of shelves and tables, and round bossy stools covered with sparkling crystals. Some of the corridors were muddy, and in plodding along these we seemed to be in the streets of some prairie village in spring time. Then we would come to handsome marble stairways conducting right and left into upper chambers ranged above one another three or four stories high, floors, ceilings, and walls lavishly decorated with innumerable crystalline forms. After thus wandering exploringly, and alone for a mile or so, fairly enchanted, a murmur of voices and a gleam of light betrayed the approach of the guide and his party, from whom, when they came up, we received a most hearty and natural stare, as we stood half-concealed in a side recess among stalagmites. I ventured to ask the dripping, crouching company how they had enjoyed their saunter, anxious to learn how the strange sunless scenery of the underworld had impressed them. "Ah,

it's nice! It's splendid!" they all replied and echoed. "The Bridal Chamber back here is just glorious! This morning we came down from the Calaveras Big Tree Grove, and the trees are nothing to it." After making this curious comparison, they hastened sunward, the guide promising to join us shortly on the bank of a deep pool, where we were to wait for him. This is a charming little lakelet of unknown depth, never yet stirred by a breeze, and its eternal calm excites the imagination even more profoundly than the silvery lakes of the glaciers rimmed with meadows and snow and reflecting sublime mountains.

Our guide, a jolly, rollicking Italian, led us into the heart of the hill, up and down, right and left, from chamber to chamber more and more magnificent, all aglitter like a glacier cave with icicle-like stalactites and stalagmites combined in forms of indescribable beauty. We were shown one large room that was occasionally used as a dancing-hall; another that was used as a chapel, with natural pulpit and crosses and pews, sermons in every stone, where a priest had said mass. Mass-saying is not so generally developed in connection with natural wonders as dancing. One of the first conceits excited by the giant sequoias was to cut one of them down and dance on its stump.

We have also seen dancing in the spray of Niagara; dancing in the famous Bower Cave above Coulterville; and nowhere have I seen so much dancing as in Yosemite. A dance on the inaccessible South Dome would likely follow the making of an easy way to the top of it.

It was delightful to witness here the infinite deliberation of Nature, and the simplicity of her methods in the production of such mighty results, such perfect repose combined with restless enthusiastic energy. Though cold and bloodless as a landscape of polar ice, building was going on in the dark with incessant activity. The archways and ceilings were everywhere hung with down-growing crystals, like inverted groves of leafless saplings, some of them large, others delicately attenuated, each tipped with a single drop of water, like the terminal bud of a pine tree. The only appreciable sounds were the dripping and tinkling of water falling into pools or faintly plashing on the crystal floors.

In some places the crystal decorations are arranged in graceful flowing folds deeply plicated like stiff silken drapery. In others straight lines of the ordinary stalactite forms are combined with reference to size and tone in a regularly graduated system like the strings

of a harp with musical tones corresponding thereto; and on these stone harps we played by striking the crystal strings with a stick. The delicious liquid tones they gave forth seemed perfectly divine as they sweetly whispered and wavered through the majestic halls and died away in faintest cadence, — the music of fairy-land. Here we lingered and reveled, rejoicing to find so much music in stony silence, so much splendor in darkness, so many mansions in the depths of the mountains, buildings ever in process of construction, yet ever finished, developing from perfection to perfection, profusion without overabundance; every particle visible or invisible in glorious motion, marching to the music of the spheres in a region regarded as the abode of eternal stillness and death.

The outer chambers of mountain caves are frequently selected as homes by wild beasts. In the Sierra, however, they seem to prefer homes and hiding-places in chaparral and beneath shelving precipices, as I have never seen their tracks in any of the caves. This is the more remarkable because notwithstanding the darkness and oozing water there is nothing uncomfortably cellar-like or sepulchral about them.

When we emerged into the bright landscapes of the sun everything looked brighter, and we

felt our faith in Nature's beauty strengthened, and saw more clearly that beauty is universal and immortal, above, beneath, on land and sea, mountain and plain, in heat and cold, light and darkness.

CHAPTER XVI

THE BEE PASTURES

When California was wild, it was one sweet bee garden throughout its entire length, north and south, and all the way across from the snowy Sierra to the ocean.

Wherever a bee might fly within the bounds of this virgin wilderness — through the redwood forests, along the banks of the rivers, along the bluffs and headlands fronting the sea, over valley and plain, park and grove, and deep, leafy glen, or far up the piny slopes of the mountains — throughout every belt and section of climate up to the timber line, bee flowers bloomed in lavish abundance. Here they grew more or less apart in special sheets and patches of no great size, there in broad, flowing folds hundreds of miles in length — zones of polleny forests, zones of flowery chaparral, stream tangles of rubus and wild rose, sheets of golden compositæ, beds of violets, beds of mint, beds of bryanthus and clover, and so on, certain species blooming somewhere all the year round.

But of late years plows and sheep have made sad havoc in these glorious pastures, destroying tens of thousands of the flowery acres like a

fire, and banishing many species of the best honey plants to rocky cliffs and fence corners, while, on the other hand, cultivation thus far has given no adequate compensation, at least in kind; only acres of alfalfa for miles of the richest wild pasture, ornamental roses and honeysuckles around cottage doors for cascades of wild roses in the dells, and small, square orchards and orange groves for broad mountain belts of chaparral.

The Great Central Plain of California, during the months of March, April, and May, was one smooth, continuous bed of honey bloom, so marvelously rich that, in walking from one end of it to the other, a distance of more than four hundred miles, your foot would press about a hundred flowers at every step. Mints, gilias, nemophilas, castilleias, and innumerable compositæ were so crowded together that, had ninety-nine per cent of them been taken away, the plain would still have seemed to any but Californians extravagantly flowery. The radiant, honeyful corollas, touching and overlapping, and rising above one another, glowed in the living light like a sunset sky — one sheet of purple and gold, with the bright Sacramento pouring through the midst of it from the north, the San Joaquin from the south, and their many tributaries sweeping in at right angles

from the mountains, dividing the plain into sections fringed with trees.

Along the rivers there is a strip of bottom-land, countersunk beneath the general level, and wider toward the foothills, where magnificent oaks, from three to eight feet in diameter, cast grateful masses of shade over the open, prairie-like levels. And close along the water's edge there was a fine jungle of tropical luxuriance, composed of wild-rose and bramble bushes and a great variety of climbing vines, wreathing and interlacing the branches and trunks of willows and alders, and swinging across from summit to summit in heavy festoons. Here the wild bees reveled in fresh bloom long after the flowers of the drier plain had withered and gone to seed. And in midsummer, when the "blackberries" were ripe, the Indians came from the mountains to feast — men, women, and babies in long, noisy trains, often joined by the farmers of the neighborhood, who gathered this wild fruit with commendable appreciation of its superior flavor, while their home orchards were full of ripe peaches, apricots, nectarines, and figs, and their vineyards were laden with grapes. But, though these luxuriant, shaggy river-beds were thus distinct from the smooth, treeless plain, they made no heavy dividing lines in general views. The whole appeared as

one continuous sheet of bloom bounded only by the mountains.

When I first saw this central garden, the most extensive and regular of all the bee pastures of the State, it seemed all one sheet of plant gold, hazy and vanishing in the distance, distinct as a new map along the foothills at my feet.

Descending the eastern slopes of the Coast Range through beds of gilias and lupines, and around many a breezy hillock and bush-crowned headland, I at length waded out into the midst of it. All the ground was covered, not with grass and green leaves, but with radiant corollas, about ankle-deep next the foothills, knee-deep or more five or six miles out. Here were bahia, madia, madaria, burrielia, chrysopsis, corethrogyne, grindelia, etc., growing in close social congregations of various shades of yellow, blending finely with the purples of clarkia, orthocarpus, and œnothera, whose delicate petals were drinking the vital sunbeams without giving back any sparkling glow.

Because so long a period of extreme drought succeeds the rainy season, most of the vegetation is composed of annuals, which spring up simultaneously, and bloom together at about the same height above the ground, the general

surface being but slightly ruffled by the taller phacelias, pentstemons, and groups of *Salvia carduacea*, the king of the mints.

Sauntering in any direction, hundreds of these happy sun-plants brushed against my feet at every step, and closed over them as if I were wading in liquid gold. The air was sweet with fragrance, the larks sang their blessed songs, rising on the wing as I advanced, then sinking out of sight in the polleny sod, while myriads of wild bees stirred the lower air with their monotonous hum—monotonous, yet forever fresh and sweet as everyday sunshine. Hares and spermophiles showed themselves in considerable numbers in shallow places, and small bands of antelopes were almost constantly in sight, gazing curiously from some slight elevation, and then bounding swiftly away with unrivaled grace of motion. Yet I could discover no crushed flowers to mark their track, nor, indeed, any destructive action of any wild foot or tooth whatever.

The great yellow days circled by uncounted, while I drifted toward the north, observing the countless forms of life thronging about me, lying down almost anywhere on the approach of night. And what glorious botanical beds I had! Oftentimes on awaking I would find several new species leaning over me and looking

me full in the face, so that my studies would begin before rising.

About the first of May I turned eastward, crossing the San Joaquin River between the mouths of the Tuolumne and Merced, and by the time I had reached the Sierra foothills most of the vegetation had gone to seed and become as dry as hay.

All the seasons of the great plain are warm or temperate, and bee flowers are never wholly wanting; but the grand springtime — the annual resurrection — is governed by the rains, which usually set in about the middle of November or the beginning of December. Then the seeds, that for six months have lain on the ground dry and fresh as if they had been gathered into barns, at once unfold their treasured life. The general brown and purple of the ground, and the dead vegetation of the preceding year, give place to the green of mosses and liverworts and myriads of young leaves. Then one species after another comes into flower, gradually overspreading the green with yellow and purple, which lasts until May.

The "rainy season" is by no means a gloomy, soggy period of constant cloudiness and rain. Perhaps nowhere else in North America, perhaps in the world, are the months of December, January, February, and March so full of bland,

plant-building sunshine. Referring to my notes of the winter and spring of 1868–69, every day of which I spent out of doors, on that section of the plain lying between the Tuolumne and Merced Rivers, I find that the first rain of the season fell on December 18. January had only six rainy days — that is, days on which rain fell; February three, March five, April three, and May three, completing the so-called rainy season, which was about an average one. The ordinary rainstorm of this region is seldom very cold or violent. The winds, which in settled weather come from the northwest, veer round into the opposite direction, the sky fills gradually and evenly with one general cloud, from which the rain falls steadily, often for days in succession, at a temperature of about 45° or 50°.

More than seventy-five per cent of all the rain of this season came from the northwest, down the coast over southeastern Alaska, British Columbia, Washington, and Oregon, though the local winds of these circular storms blow from the southeast. One magnificent local storm from the northwest fell on March 21. A massive, round-browed cloud came swelling and thundering over the flowery plain in most imposing majesty, its bossy front burning white and purple in the full blaze of the sun,

while warm rain poured from its ample fountains like a cataract, beating down flowers and bees, and flooding the dry water-courses as suddenly as those of Nevada are flooded by the so-called "cloud-bursts." But in less than half an hour not a trace of the heavy, mountain-like cloud structure was left in the sky, and the bees were on the wing, as if nothing more gratefully refreshing could have been sent them.

By the end of January four species of plants were in flower, and five or six mosses had already adjusted their hoods and were in the prime of life; but the flowers were not sufficiently numerous as yet to affect greatly the general green of the young leaves. Violets made their appearance in the first week of February, and toward the end of this month the warmer portions of the plain were already golden with myriads of the flowers of rayed compositæ.

This was the full springtime. The sunshine grew warmer and richer, new plants bloomed every day; the air became more tuneful with humming wings, and sweeter with the fragrance of the opening flowers. Ants and ground squirrels were getting ready for their summer work, rubbing their benumbed limbs, and sunning themselves on the husk-piles before their doors, and spiders were busy mending their old webs, or weaving new ones.

In March, the vegetation was more than doubled in depth and color; claytonia, calandrinia, a large white gilia, and two nemophilas were in bloom, together with a host of yellow compositæ, tall enough now to bend in the wind and show wavering ripples of shade.

In April, plant life, as a whole, reached its greatest height, and the plain, over all its varied surface, was mantled with a close, furred plush of purple and golden corollas. By the end of this month, most of the species had ripened their seeds, but undecayed, still seemed to be in bloom from the numerous corolla-like involucres and whorls of chaffy scales of the compositæ. In May, the bees found in flower only a few deep-set liliaceous plants and eriogonums.

June, July, August, and September is the season of rest and sleep, — a winter of dry heat, — followed in October by a second outburst of bloom at the very driest time of the year. Then, after the shrunken mass of leaves and stalks of the dead vegetation crinkle and turn to dust beneath the foot, as if it had been baked in an oven, *Hemizonia virgata*, a slender, unobtrusive little plant, from six inches to three feet high, suddenly makes its appearance in patches miles in extent, like a resurrection of the bloom of April. I have counted upward of three thousand flowers, five eighths of an inch

in diameter, on a single plant. Both its leaves and stems are so slender as to be nearly invisible, at a distance of a few yards, amid so showy a multitude of flowers. The ray and disk flowers are both yellow, the stamens purple, and the texture of the rays is rich and velvety, like the petals of garden pansies. The prevailing wind turns all the heads round to the southeast, so that in facing northwestward we have the flowers looking us in the face. In my estimation, this little plant, the last born of the brilliant host of compositæ that glorify the plain, is the most interesting of all. It remains in flower until November, uniting with two or three species of wiry eriogonums, which continue the floral chain around December to the spring flowers of January. Thus, although the main bloom and honey season is only about three months long, the floral circle, however thin around some of the hot, rainless months, is never completely broken.

How long the various species of wild bees have lived in this honey garden, nobody knows; probably ever since the main body of the present flora gained possession of the land, toward the close of the glacial period. The first brown honey-bees brought to California are said to have arrived in San Francisco in March, 1853. A bee-keeper by the name of Shelton purchased

a lot, consisting of twelve swarms, from some one at Aspinwall, who had brought them from New York. When landed at San Francisco, all the hives contained live bees, but they finally dwindled to one hive, which was taken to San José. The little immigrants flourished and multiplied in the bountiful pastures of the Santa Clara Valley, sending off three swarms the first season. The owner was killed shortly afterward, and in settling up his estate, two of the swarms were sold at auction for $105 and $110 respectively. Other importations were made, from time to time, by way of the Isthmus, and, though great pains were taken to insure success, about one half usually died on the way. Four swarms were brought safely across the plains in 1859, the hives being placed in the rear end of a wagon, which was stopped in the afternoon to allow the bees to fly and feed in the floweriest places that were within reach until dark, when the hives were closed.

In 1855, two years after the time of the first arrivals from New York, a single swarm was brought over from San José, and let fly in the Great Central Plain. Bee-culture, however, has never gained much attention here, notwithstanding the extraordinary abundance of honey bloom, and the high price of honey during the early years. A few hives are found here

and there among settlers who chanced to have learned something about the business before coming to the State. But sheep, cattle, grain, and fruit raising are the chief industries, as they require less skill and care, while the profits thus far have been greater. In 1856 honey sold here at from one and a half to two dollars per pound. Twelve years later the price had fallen to twelve and a half cents. In 1868 I sat down to dinner with a band of ravenous sheep-shearers at a ranch on the San Joaquin, where fifteen or twenty hives were kept, and our host advised us not to spare the large pan of honey he had placed on the table, as it was the cheapest article he had to offer. In all my walks, however, I have never come upon a regular bee ranch in the Central Valley like those so common and so skillfully managed in the southern counties of the State. The few pounds of honey and wax produced are consumed at home, and are scarcely taken into account among the coarser products of the farm. The swarms that escape from their careless owners have a weary, perplexing time of it in seeking suitable homes. Most of them make their way to the foothills of the mountains, or to the trees that line the banks of the rivers, where some hollow log or trunk may be found. A friend of mine, while out hunting on the San Joaquin, came upon an

old coon trap, hidden among some tall grass, near the edge of the river, upon which he sat down to rest. Shortly afterward his attention was attracted to a crowd of angry bees that were flying excitedly about his head, when he discovered that he was sitting upon their hive, which was found to contain more than two hundred pounds of honey. Out in the broad, swampy delta of the Sacramento and San Joaquin Rivers, the little wanderers have been known to build their combs in a bunch of rushes, or stiff, wiry grass, only slightly protected from the weather, and in danger every spring of being carried away by floods. They have the advantage, however, of a vast extent of fresh pasture, accessible only to themselves.

The present condition of the Grand Central Garden is very different from that we have sketched. About twenty years ago, when the gold placers had been pretty thoroughly exhausted, the attention of fortune-seekers — not home-seekers — was, in great part, turned away from the mines to the fertile plains, and many began experiments in a kind of restless, wild agriculture. A load of lumber would be hauled to some spot on the free wilderness, where water could be easily found, and a rude box cabin built. Then a gang-plough was procured, and a dozen mustang ponies, worth ten

or fifteen dollars apiece, and with these hundreds of acres were stirred as easily as if the land had been under cultivation for years, tough, perennial roots being almost wholly absent. Thus a ranch was established, and from these bare wooden huts, as centers of desolation, the wild flora vanished in ever-widening circles. But the arch destroyers are the shepherds, with their flocks of hoofed locusts, sweeping over the ground like a fire, and trampling down every rod that escapes the plough as completely as if the whole plain were a cottage garden-plot without a fence. But notwithstanding these destroyers, a thousand swarms of bees may be pastured here for every one now gathering honey. The greater portion is still covered every season with a repressed growth of bee flowers, for most of the species are annuals, and many of them are not relished by sheep or cattle, while the rapidity of their growth enables them to develop and mature their seeds before any foot has time to crush them. The ground is, therefore, kept sweet, and the race is perpetuated, though only as a suggestive shadow of the magnificence of its wildness.

The time will undoubtedly come when the entire area of this noble valley will be tilled like a garden, when the fertilizing waters of the

mountains, now flowing to the sea, will be distributed to every acre, giving rise to prosperous towns, wealth, arts, etc. Then, I suppose, there will be few left, even among botanists, to deplore the vanished primeval flora. In the mean time, the pure waste going on — the wanton destruction of the innocents — is a sad sight to see, and the sun may well be pitied in being compelled to look on.

The bee pastures of the Coast Ranges last longer and are more varied than those of the great plain, on account of differences of soil and climate, moisture, and shade, etc. Some of the mountains are upward of four thousand feet in height, and small streams, springs, oozy bogs, etc., occur in great abundance and variety in the wooded regions, while open parks, flooded with sunshine, and hill-girt valleys lying at different elevations, each with its own peculiar climate and exposure, possess the required conditions for the development of species and families of plants widely varied.

Next the plain there is, first, a series of smooth hills, planted with a rich and showy vegetation that differs but little from that of the plain itself — as if the edge of the plain had been lifted and bent into flowing folds, with all its flowers in place, only toned down a little as to their luxuriance, and a few new species in-

troduced, such as the hill lupines, mints, and gilias. The colors show finely when thus held to view on the slopes; patches of red, purple, blue, yellow, and white, blending around the edges, the whole appearing at a little distance like a map colored in sections.

Above this lies the park and chaparral region, with oaks, mostly evergreen, planted wide apart, and blooming shrubs from three to ten feet high; manzanita and ceanothus of several species, mixed with rhamnus, cercis, pickeringia, cherry, amelanchier, and adenostoma, in shaggy, interlocking thickets, and many species of hosackia, clover, monardella, castilleia, etc., in the openings.

The main ranges send out spurs somewhat parallel to their axes, inclosing level valleys, many of them quite extensive, and containing a great profusion of sun-loving bee flowers in their wild state; but these are, in great part, already lost to the bees by cultivation.

Nearer the coast are the giant forests of the redwoods, extending from near the Oregon line to Santa Cruz. Beneath the cool, deep shade of these majestic trees the ground is occupied by ferns, chiefly woodwardia and aspidiums, with only a few flowering plants — oxalis, trientalis, erythronium, fritillaria, smilax, and other shade-lovers. But all along the redwood

belt there are sunny openings on hill-slopes looking to the south, where the giant trees stand back, and give the ground to the small sunflowers and the bees. Around the lofty redwood walls of these little bee acres there is usually a fringe of chestnut oak, laurel, and madroño, the last of which is a surpassingly beautiful tree, and a great favorite with the bees. The trunks of the largest specimens are seven or eight feet thick, and about fifty feet high; the bark red and chocolate colored, the leaves plain, large, and glossy, like those of *Magnolia grandiflora*, while the flowers are yellowish-white, and urn-shaped, in well-proportioned panicles, from five to ten inches long. When in full bloom, a single tree seems to be visited at times by a whole hive of bees at once, and the deep hum of such a multitude makes the listener guess that more than the ordinary work of honey-winning must be going on.

How perfectly enchanting and care-obliterating are these withdrawn gardens of the woods — long vistas opening to the sea — sunshine sifting and pouring upon the flowery ground in a tremulous, shifting mosaic, as the light-ways in the leafy wall open and close with the swaying breeze — shining leaves and flowers, birds and bees, mingling together in springtime har-

mony, and soothing fragrance exhaling from a thousand thousand fountains! In these balmy, dissolving days, when the deep heart-beats of Nature are felt thrilling rocks and trees and everything alike, common business and friends are happily forgotten, and even the natural honey work of bees, and the care of birds for their young, and mothers for their children, seem slightly out of place.

To the northward, in Humboldt and the adjacent counties, whole hillsides are covered with rhododendron, making a glorious melody of bee bloom in the spring. And the Western azalea, hardly less flowery, grows in massy thickets three to eight feet high around the edges of groves and woods as far south as San Luis Obispo, usually accompanied by manzanita; while the valleys, with their varying moisture and shade, yield a rich variety of the smaller honey flowers, such as mentha, lycopus, micromeria, audibertia, trichostema, and other mints; with vaccinium, wild strawberry, geranium, calais, and goldenrod; and in the cool glens along the stream-banks, where the shade of trees is not too deep, spiræa, dogwood, heteromeles, and calycanthus, and many species of rubus form interlacing tangles, some portion of which continues in bloom for months.

Though the coast region was the first to be

invaded and settled by white men, it has suffered less from a bee point of view than either of the other main divisions, chiefly, no doubt, because of the unevenness of the surface, and because it is owned and protected instead of lying exposed to the flocks of the wandering "sheepmen." These remarks apply more particularly to the north half of the coast. Farther south there is less moisture, less forest shade, and the honey flora is less varied.

The Sierra region is the largest of the three main divisions of the bee lands of the State, and the most regularly varied in its subdivisions, owing to their gradual rise from the level of the Central Plain to the alpine summits. The foothill region is about as dry and sunful, from the end of May until the setting in of the winter rains, as the plain. There are no shady forests, no damp glens, at all like those lying at the same elevations in the Coast Mountains. The social compositæ of the plain, with a few added species, form the bulk of the herbaceous portion of the vegetation up to a height of fifteen hundred feet or more, shaded lightly here and there with oaks and Sabine pines, and interrupted by patches of ceanothus and buckeye. Above this, and just below the forest region, there is a dark, heath-like belt of chaparral, composed almost exclusively of *Adenos-*

toma fasciculata, a bush belonging to the rose family, from five to eight feet high, with small, round leaves in fascicles, and bearing a multitude of small white flowers in panicles on the ends of the upper branches. Where it occurs at all, it usually covers all the ground with a close, impenetrable growth, scarcely broken for miles.

Up through the forest region, to a height of about nine thousand feet above sea-level, there are ragged patches of manzanita, and five or six species of ceanothus, called deer-brush or California lilac. These are the most important of all the honey-bearing bushes of the Sierra. *Chamæbatia foliolosa*, a little shrub about a foot high, with flowers like the strawberry, makes handsome carpets beneath the pines, and seems to be a favorite with the bees; while pines themselves furnish unlimited quantities of pollen and honey dew. The product of a single tree, ripening its pollen at the right time of year, would be sufficient for the wants of a whole hive. Along the streams there is a rich growth of lilies, larkspurs, pedicularis, castilleias, and clover. The alpine region contains the flowery glacier meadows, and countless small gardens in all sorts of places full of potentilla of several species, spraguea, ivesia, epilobium, and golden-rod, with beds of bryanthus and the charming cassiope covered with sweet bells. Even the

tops of the mountains are blessed with flowers, — dwarf phlox, polemonium, ribes, hulsea, etc. I have seen wild bees and butterflies feeding at a height of thirteen thousand feet above the sea. Many, however, that go up these dangerous heights never come down again. Some, undoubtedly, perish in storms, and I have found thousands lying dead or benumbed on the surface of the glaciers, to which they had perhaps been attracted by the white glare, taking them for beds of bloom.

From swarms that escaped their owners in the lowlands, the honey bee is now generally distributed throughout the whole length of the Sierra, up to an elevation of eight thousand feet above sea-level. At this height they flourish without care, though the snow every winter is deep. Even higher than this several bee trees have been cut which contained over two hundred pounds of honey.

The destructive action of sheep has not been so general on the mountain pastures as on those of the great plain, but in many places it has been more complete, owing to the more friable character of the soil, and its sloping position. The slant digging and down-raking action of hoofs on the steeper slopes of moraines has uprooted and buried many of the tender plants from year to year, without allowing them time

to mature their seeds. The shrubs, too, are badly bitten, especially the various species of ceanothus. Fortunately, neither sheep nor cattle care to feed on the manzanita, spiræa, or adenostoma; and these fine honey-bushes are too stiff and tall, or grow in places too rough and inaccessible, to be trodden under foot. Also the cañon walls and gorges, which form so considerable a part of the area of the range, while inaccessible to domestic sheep, are well fringed with honey shrubs, and contain thousands of lovely bee gardens, lying hid in narrow side cañons and recesses fenced with avalanche taluses, and on the top of flat, projecting headlands, where only bees would think to look for them.

But, on the other hand, a great portion of the woody plants that escape the feet and teeth of the sheep are destroyed by the shepherds by means of running fires, which are set everywhere during the dry autumn for the purpose of burning off the old fallen trunks and underbrush, with a view to improving the pastures, and making more open ways for the flocks. These destructive sheep fires sweep through nearly the entire forest belt of the range, from one extremity to the other, consuming not only the underbrush, but the young trees and seedlings on which the permanence of the forests

depends; thus setting in motion a long train of evils which will certainly reach far beyond bees and bee-keepers.

The plough has not yet invaded the forest region to any appreciable extent, neither has it accomplished much in the foothills. Thousands of bee-ranches might be established along the margin of the plain, and up to a height of four thousand feet, wherever water could be obtained. The climate at this elevation admits of the making of permanent homes, and by moving the hives to higher pastures as the lower pass out of bloom, the annual yield of honey would be nearly doubled. The foothill pastures, as we have seen, fail about the end of May, those of the chaparral belt and lower forests are in full bloom in June, those of the upper and alpine region in July, August, and September. In Scotland, after the best of the Lowland bloom is past, the bees are carried in carts to the Highlands, and set free on the heather hills. In France, too, and in Poland, they are carried from pasture to pasture among orchards and fields in the same way, and along the rivers in barges to collect the honey of the delightful vegetation of the banks. In Egypt they are taken far up the Nile, and floated slowly home again, gathering the honey harvest of the various fields on the way, timing their movements

in accord with the seasons. Were similar methods pursued in California the productive season would last nearly all the year.

The average elevation of the north half of the Sierra is, as we have seen, considerably less than that of the south half, and small streams, with the bank and meadow gardens dependent upon them, are less abundant. Around the head waters of the Yuba, Feather, and Pitt Rivers, the extensive tablelands of lava are sparsely planted with pines, through which the sunshine reaches the ground with little interruption. Here flourishes a scattered, tufted growth of golden applopappus, linosyris, bahia, wyetheia, arnica, artemisia, and similar plants; with manzanita, cherry, plum, and thorn in ragged patches on the cooler hill-slopes. At the extremities of the Great Central Plain, the Sierra and Coast Ranges curve around and lock together in a labyrinth of mountains and valleys, throughout which their floras are mingled, making at the north, with its temperate climate and copious rainfall, a perfect paradise for bees, though, strange to say, scarcely a single regular bee ranch has yet been established in it.

Of all the upper flower fields of the Sierra, Shasta is the most honeyful, and may yet surpass in fame the celebrated honey hills of Hybla and heathy Hymettus. Regarding this

noble mountain from a bee point of view, encircled by its many climates, and sweeping aloft from the torrid plain into the frosty azure, we find the first five thousand feet from the summit generally snow-clad, and therefore about as honeyless as the sea. The base of this arctic region is girdled by a belt of crumbling lava measuring about one thousand feet in vertical breadth, and is mostly free from snow in summer. Beautiful lichens enliven the faces of the cliffs with their bright colors, and in some of the warmer nooks there are a few tufts of alpine daisies, wall-flowers and pentstemons; but, notwithstanding these bloom freely in the late summer, the zone as a whole is almost as honeyless as the icy summit, and its lower edge may be taken as the honey-line. Immediately below this comes the forest zone, covered with a rich growth of conifers, chiefly silver firs, rich in pollen and honey dew, and diversified with countless garden openings, many of them less than a hundred yards across. Next, in orderly succession, comes the great bee zone. Its area far surpasses that of the icy summit and both the other zones combined, for it goes sweeping majestically around the entire mountain, with a breadth of six or seven miles and a circumference of nearly a hundred miles.

Shasta, as we have already seen, is a fire

mountain created by a succession of eruptions of ashes and molten lava, which, flowing over the lips of its several craters, grew outward and upward like the trunk of a knotty exogenous tree. Then followed a strange contrast. The glacial winter came on, loading the cooling mountain with ice, which flowed slowly outward in every direction, radiating from the summit in the form of one vast conical glacier — a down-crawling mantle of ice upon a fountain of smoldering fire, crushing and grinding for centuries its brown, flinty lavas with incessant activity, and thus degrading and remodeling the entire mountain. When, at length, the glacial period began to draw near its close, the ice-mantle was gradually melted off around the bottom, and, in receding and breaking into its present fragmentary condition, irregular rings and heaps of moraine matter were stored upon its flanks. The glacial erosion of most of the Shasta lavas produces detritus, composed of rough, sub-angular boulders of moderate size and of porous gravel and sand, which yields freely to the transporting power of running water. Magnificent floods from the ample fountains of ice and snow working with sublime energy upon this prepared glacial detritus, sorted it out and carried down immense quantities from the higher slopes, and reformed it in

smooth, delta-like beds around the base; and it is these flood-beds joined together that now form the main honey zone of the old volcano.

Thus, by forces seemingly antagonistic and destructive, has Mother Nature accomplished her beneficent designs — now a flood of fire, now a flood of ice, now a flood of water; and at length an outburst of organic life, a milky way of snowy petals and wings, girdling the rugged mountain like a cloud, as if the vivifying sunbeams beating against its sides had broken into a foam of plant bloom and bees, as sea waves break and bloom on a rock shore.

In this flowery wilderness the bees rove and revel, rejoicing in the bounty of the sun, clambering eagerly through bramble and huckle bloom, ringing the myriad bells of the manzanita, now humming aloft among polleny willows and firs, now down on the ashy ground among gilias and buttercups, and anon plunging deep into snowy banks of cherry and buckthorn. They consider the lilies and roll into them, and, like lilies, they toil not, for they are impelled by sun-power, as water-wheels by water-power; and when the one has plenty of high-pressure water, the other plenty of sunshine, they hum and quiver alike. Sauntering in the Shasta bee lands in the sun-days of summer, one may readily infer the time of day

from the comparative energy of bee movements alone — drowsy and moderate in the cool of the morning, increasing in energy with the ascending sun, and, at high noon, thrilling and quivering in wild ecstasy, then gradually declining again to the stillness of night. In my excursions among the glaciers I occasionally meet bees that are hungry, like mountaineers who venture too far and remain too long above the bread-line; then they droop and wither like autumn leaves. The Shasta bees are perhaps better fed than any others in the Sierra. Their field work is one perpetual feast; but, however exhilarating the sunshine or bountiful the supply of flowers, they are always dainty feeders. Humming-moths and hummingbirds seldom set foot upon a flower, but poise on the wing in front of it, and reach forward as if they were sucking through straws. But bees, though as dainty as they, hug their favorite flowers with profound cordiality, and push their blunt, polleny faces against them, like babies on their mother's bosom. And fondly, too, with eternal love, does Mother Nature clasp her small bee-babies, and suckle them, multitudes at once, on her warm Shasta breast.

Besides the common honey bee there are many other species here — fine mossy, burly fellows, who were nourished on the mountains

thousands of sunny seasons before the advent of the domestic species. Among these are the bumblebees, mason-bees, carpenter-bees, and leaf-cutters. Butterflies, too, and moths of every size and pattern; some broad-winged like bats, flapping slowly, and sailing in easy curves; others like small, flying violets, shaking about loosely in short, crooked flights close to the flowers, feasting luxuriously night and day. Great numbers of deer also delight to dwell in the brushy portions of the bee pastures.

Bears, too, roam the sweet wilderness, their blunt, shaggy forms harmonizing well with the trees and tangled bushes, and with the bees, also, notwithstanding the disparity in size. They are fond of all good things, and enjoy them to the utmost, with but little troublesome discrimination — flowers and leaves as well as berries, and the bees themselves as well as their honey. Though the California bears have as yet had but little experience with honey bees, they often succeed in reaching their bountiful stores, and it seems doubtful whether bees themselves enjoy honey with so great a relish. By means of their powerful teeth and claws they can gnaw and tear open almost any hive conveniently accessible. Most honey bees, however, in search of a home are wise enough to make choice of a hollow in a living tree, a

considerable distance above the ground, when such places are to be had; then they are pretty secure, for though the smaller black and brown bears climb well, they are unable to break into strong hives while compelled to exert themselves to keep from falling, and at the same time to endure the stings of the fighting bees without having their paws free to rub them off. But woe to the black bumblebees discovered in their mossy nests in the ground! With a few strokes of their huge paws the bears uncover the entire establishment, and, before time is given for a general buzz, bees old and young, larvæ, honey, stings, nest, and all are taken in one ravishing mouthful.

Not the least influential of the agents concerned in the superior sweetness of the Shasta flora are its storms — storms I mean that are strictly local, bred and born on the mountain. The magical rapidity with which they are grown on the mountain-top, and bestow their charity in rain and snow, never fails to astonish the inexperienced lowlander. Often in calm, glowing days, while the bees are still on the wing, a storm cloud may be seen far above in the pure ether, swelling its pearl bosses, and growing silently, like a plant. Presently a clear, ringing discharge of thunder is heard, followed by a rush of wind that comes sounding over the

bending woods like the roar of the ocean, mingling raindrops, snow-flowers, honey flowers, and bees in wild storm harmony.

Still more impressive are the warm, reviving days of spring in the mountain pastures. The blood of the plants throbbing beneath the life-giving sunshine seems to be heard and felt. Plant growth goes on before our eyes, and every tree in the woods, and every bush and flower is seen as a hive of restless industry. The deeps of the sky are mottled with singing wings of every tone and color; clouds of brilliant chrysididæ dancing and swirling in exquisite rhythm, golden-barred vespidæ, dragon-flies, butterflies, grating cicadas, and jolly, rattling grasshoppers, fairly enameling the light.

On bright, crisp mornings a striking optical effect may frequently be observed from the shadows of the higher mountains while the sunbeams are pouring past overhead. Then every insect, no matter what may be its own proper color, burns white in the light. Gauzy-winged hymenoptera, moths, jet-black beetles, all are transfigured alike in pure, spiritual white, like snowflakes.

In southern California, where bee culture has had so much skillful attention of late years, the pasturage is not more abundant, or more advantageously varied as to the number of its

honey-plants and their distribution over mountain and plain, than that of many other portions of the State where the industrial currents flow in other channels. The famous white sage (*Audibertia*), belonging to the mint family, flourishes here in all its glory, blooming in May, and yielding great quantities of clear, pale honey, which is greatly prized in every market it has yet reached. This species grows chiefly in the valleys and low hills. The black sage on the mountains is part of a dense, thorny chaparral, which is composed chiefly of adenostoma, ceanothus, manzanita, and cherry — not differing greatly from that of the southern portion of the Sierra, but more dense and continuous, and taller, and remaining longer in bloom. Stream-side gardens, so charming a feature of both the Sierra and Coast Mountains, are less numerous in southern California, but they are exceedingly rich in honey flowers, wherever found, — melilotus, columbine, collinsia, verbena, zauschneria, wild rose, honeysuckle, philadelphus, and lilies rising from the warm, moist dells in a very storm of exuberance. Wild buckwheat of many species is developed in abundance over the dry, sandy valleys and lower slopes of the mountains, toward the end of summer, and is, at this time, the main dependence of the bees, reinforced here and there

by orange groves, alfalfa fields, and small home gardens.

The main honey months, in ordinary seasons, are April, May, June, July, and August; while the other months are usually flowery enough to yield sufficient for the bees.

According to Mr. J. T. Gordon, president of the Los Angeles County Bee-Keepers' Association, the first bees introduced into the county were a single hive, which cost one hundred and fifty dollars in San Francisco, and arrived in September, 1854.[1] In April, of the following year, this hive sent out two swarms, which were sold for one hundred dollars each. From this small beginning the bees gradually multiplied to about three thousand swarms in the year 1873. In 1876 it was estimated that there were between fifteen and twenty thousand hives in the county, producing an annual yield of about one hundred pounds to the hive — in some exceptional cases, a much greater yield.

In San Diego County, at the beginning of the season of 1878, there were about twenty-four thousand hives, and the shipments from the one port of San Diego for the same year, from July 17 to November 10, were 1071 barrels,

[1] Fifteen hives of Italian bees were introduced into Los Angeles County in 1855, and in 1876 they had increased to five hundred. The marked superiority claimed for them over the common species is now attracting considerable attention.

15,544 cases, and nearly ninety tons. The largest bee ranches have about a thousand hives, and are carefully and skillfully managed, every scientific appliance of merit being brought into use. There are few bee keepers, however, who own half as many as this, or who give their undivided attention to the business. Orange culture, at present, is heavily overshadowing every other business.

A good many of the so-called bee ranches of Los Angeles and San Diego counties are still of the rudest pioneer kind imaginable. A man unsuccessful in everything else hears the interesting story of the profits and comforts of bee-keeping, and concludes to try it; he buys a few colonies, or gets them from some overstocked ranch on shares, takes them back to the foot of some cañon, where the pasturage is fresh, squats on the land, with, or without, the permission of the owner, sets up his hives, makes a box cabin for himself, scarcely bigger than a beehive, and awaits his fortune.

Bees suffer sadly from famine during the dry years which occasionally occur in the southern and middle portions of the State. If the rainfall amounts only to three or four inches, instead of from twelve to twenty, as in ordinary seasons, then sheep and cattle die in thousands, and so do these small, winged cattle, unless

they are carefully fed, or removed to other pastures. The year 1877 will long be remembered as exceptionally rainless and distressing. Scarcely a flower bloomed on the dry valleys away from the stream-sides, and not a single grain-field depending upon rain was reaped. The seed only sprouted, came up a little way, and withered. Horses, cattle, and sheep grew thinner day by day, nibbling at bushes and weeds, along the shallowing edges of streams, many of which were dried up altogether, for the first time since the settlement of the country.

In the course of a trip I made during the summer of that year through Monterey, San Luis Obispo, Santa Barbara, Ventura, and Los Angeles Counties, the deplorable effects of the drought were everywhere visible — leafless fields, dead and dying cattle, dead bees, and half-dead people with dusty, doleful faces. Even the birds and squirrels were in distress, though their suffering was less painfully apparent than that of the poor cattle. These were falling one by one in slow, sure starvation along the banks of the hot, sluggish streams, while thousands of buzzards correspondingly fat were sailing above them, or standing gorged on the ground beneath the trees, waiting with easy faith for fresh carcasses. The quails, pru-

dently considering the hard times, abandoned all thought of pairing. They were too poor to marry, and so continued in flocks all through the year without attempting to rear young. The ground-squirrels, though an exceptionally industrious and enterprising race, as every farmer knows, were hard pushed for a living; not a fresh leaf or seed was to be found save in the trees, whose bossy masses of dark green foliage presented a striking contrast to the ashen baldness of the ground beneath them. The squirrels, leaving their accustomed feeding-grounds, betook themselves to the leafy oaks to gnaw out the acorn stores of the provident woodpeckers, but the latter kept up a vigilant watch upon their movements. I noticed four woodpeckers in league against one squirrel, driving the poor fellow out of an oak that they claimed. He dodged round the knotty trunk from side to side, as nimbly as he could in his famished condition, only to find a sharp bill everywhere. But the fate of the bees that year seemed the saddest of all. In different portions of Los Angeles and San Diego counties, from one half to three fourths of them died of sheer starvation. Not less than eighteen thousand colonies perished in these two counties alone, while in the adjacent counties the death-rate was hardly less.

Even the colonies nearest to the mountains suffered this year, for the smaller vegetation on the foothills was affected by the drought almost as severely as that of the valleys and plains, and even the hardy, deep-rooted chaparral, the surest dependence of the bees, bloomed sparingly, while much of it was beyond reach. Every swarm could have been saved, however, by promptly supplying them with food when their own stores began to fail, and before they became enfeebled and discouraged; or by cutting roads back into the mountains, and taking them into the heart of the flowery chaparral. The Santa Lucia, San Rafael, San Gabriel, San Jacinto, and San Bernardino Ranges are almost untouched as yet save by the wild bees. Some idea of their resources, and of the advantages and disadvantages they offer to bee-keepers, may be formed from an excursion that I made into the San Gabriel Range about the beginning of August of "the dry year." This range, containing most of the characteristic features of the other ranges just mentioned, overlooks the Los Angeles vineyards and orange groves from the north, and is more rigidly inaccessible in the ordinary meaning of the word than any other that I ever attempted to penetrate. The slopes are exceptionally steep and insecure to the foot, and they are covered with

thorny bushes from five to ten feet high. With the exception of little spots not visible in general views, the entire surface is covered with them, massed in close hedge growth, sweeping gracefully down into every gorge and hollow, and swelling over every ridge and summit in shaggy, ungovernable exuberance, offering more honey to the acre for half the year than the most crowded clover-field. But when beheld from the open San Gabriel Valley, beaten with dry sunshine, all that was seen of the range seemed to wear a forbidding aspect. From base to summit all seemed gray, barren, silent, its glorious chaparral appearing like dry moss creeping over its dull, wrinkled ridges and hollows.

Setting out from Pasadena, I reached the foot of the range about sundown; and being weary and heated with my walk across the shadeless valley, concluded to camp for the night. After resting a few moments, I began to look about among the flood boulders of Eaton Creek for a camp-ground, when I came upon a strange, dark-looking man who had been chopping cordwood. He seemed surprised at seeing me, so I sat down with him on the live-oak log he had been cutting, and made haste to give a reason for my appearance in his solitude, explaining that I was anxious to find out some-

thing about the mountains, and meant to make my way up Eaton Creek next morning. Then he kindly invited me to camp with him, and led me to his little cabin, situated at the foot of the mountains, where a small spring oozes out of a bank overgrown with wild-rose bushes. After supper, when the daylight was gone, he explained that he was out of candles; so we sat in the dark, while he gave me a sketch of his life in a mixture of Spanish and English. He was born in Mexico, his father Irish, his mother Spanish. He had been a miner, rancher, prospector, hunter, etc., rambling always, and wearing his life away in mere waste; but now he was going to settle down. His past life, he said, was of "no account," but the future was promising. He was going to "make money and marry a Spanish woman." People mine here for water as for gold. He had been running a tunnel into a spur of the mountain back of his cabin. "My prospect is good," he said, "and if I chance to strike a good, strong flow, I'll soon be worth five or ten thousand dollars. For that flat out there," referring to a small, irregular patch of bouldery detritus, two or three acres in size, that had been deposited by Eaton Creek during some flood season, — "that flat is large enough for a nice orange grove, and the bank behind the cabin will do for a vineyard,

and after watering my own trees and vines I will have some water left to sell to my neighbors below me, down the valley. And then," he continued, "I can keep bees, and make money that way, too, for the mountains above here are just full of honey in the summer-time, and one of my neighbors down here says that he will let me have a whole lot of hives, on shares, to start with. You see I've a good thing; I'm all right now." All this prospective affluence in the sunken, boulder-choked flood-bed of a mountain stream! Leaving the bees out of the count, most fortune-seekers would as soon think of settling on the summit of Mount Shasta. Next morning, wishing my hopeful entertainer good luck, I set out on my shaggy excursion.

About half an hour's walk above the cabin, I came to "The Fall," famous throughout the valley settlements as the finest yet discovered in the San Gabriel Mountains. It is a charming little thing, with a low, sweet voice, singing like a bird, as it pours from a notch in a short ledge, some thirty-five or forty feet into a round mirror-pool. The face of the cliff back of it, and on both sides, is smoothly covered and embossed with mosses, against which the white water shines out in showy relief, like a silver instrument in a velvet case. Hither come the

San Gabriel lads and lassies, to gather ferns and dabble away their hot holidays in the cool water, glad to escape from their commonplace palm gardens and orange groves. The delicate maidenhair grows on fissured rocks within reach of the spray, while broad-leaved maples and sycamores cast soft, mellow shade over a rich profusion of bee flowers, growing among boulders in front of the pool — the fall, the flowers, the bees, the ferny rocks, and leafy shade forming a charming little poem of wildness, the last of a series extending down the flowery slopes of Mount San Antonio through the rugged, foam-beaten bosses of the main Eaton Cañon.

From the base of the fall I followed the ridge that forms the western rim of the Eaton basin to the summit of one of the principal peaks, which is about five thousand feet above sea-level. Then, turning eastward, I crossed the middle of the basin, forcing a way over its many subordinate ridges and across its eastern rim, having to contend almost everywhere with the floweriest and most impenetrable growth of honey bushes I had ever encountered since first my mountaineering began. Most of the Shasta chaparral is leafy nearly to the ground; here the main stems are naked for three or four feet, and interspiked with dead twigs, forming a stiff

chevaux-de-frise through which even the bears make their way with difficulty. I was compelled to creep for miles on all fours, and in following the bear trails often found tufts of hair on the bushes where they had forced themselves through.

For one hundred feet or so above the fall the ascent was made possible only by tough cushions of club moss that clung to the rock. Above this the ridge weathers away to a thin knife-blade for a few hundred yards, and thence to the summit of the range it carries a bristly mane of chaparral. Here and there small openings occur on rocky places, commanding fine views across the cultivated valley to the ocean. These I found by the tracks were favorite outlooks and resting-places for the wild animals — bears, wolves, foxes, wildcats, etc. — which abound here, and would have to be taken into account in the establishment of bee ranches. In the deepest thickets I found wood-rat villages — groups of huts four to six feet high, built of sticks and leaves in rough, tapering piles, like muskrat cabins. I noticed a good many bees, too, most of them wild. The tame honey bees seemed languid and wing-weary, as if they had come all the way up from the flowerless valley.

After reaching the summit I had time to

make only a hasty survey of the basin, now glowing in the sunset gold, before hastening down into one of the tributary cañons in search of water. Emerging from a particularly tedious breadth of chaparral, I found myself free and erect in a beautiful park-like grove of mountain live-oak, where the ground was planted with aspidiums and brier roses, while the glossy foliage made a close canopy overhead, leaving the gray dividing trunks bare to show the beauty of their interlacing arches. The bottom of the cañon was dry where I first reached it, but a bunch of scarlet mimulus indicated water at no great distance, and I soon discovered about a bucketful in a hollow of the rock. This, however, was full of dead bees, wasps, beetles, and leaves, well steeped and simmered, and would, therefore, require boiling and filtering through fresh charcoal before it could be made available. Tracing the dry channel about a mile farther down to its junction with a larger tributary cañon, I at length discovered a lot of boulder pools, clear as crystal, brimming full, and linked together by glistening streamlets just strong enough to sing audibly. Flowers in full bloom adorned their margins, lilies ten feet high, larkspur, columbines, and luxuriant ferns, leaning and overarching in lavish abundance, while a noble old

live-oak spread its rugged arms over all. Here I camped, making my bed on smooth cobblestones.

Next day, in the channel of a tributary that heads on Mount San Antonio, I passed about fifteen or twenty gardens like the one in which I slept — lilies in every one of them, in the full pomp of bloom. My third camp was made near the middle of the general basin, at the head of a long system of cascades from ten to two hundred feet high, one following the other in close succession down a rocky, inaccessible cañon, making a total descent of nearly seventeen hundred feet. Above the cascades the main stream passes through a series of open, sunny levels, the largest of which are about an acre in size, where the wild bees and their companions were feasting on a showy growth of zauschneria, painted cups, and monardella; and gray squirrels were busy harvesting the burs of the Douglas spruce, the only conifer I met in the basin.

The eastern slopes of the basin are in every way similar to those we have described, and the same may be said of other portions of the range. From the highest summit, far as the eye could reach, the landscape was one vast bee pasture, a rolling wilderness of honey bloom, scarcely broken by bits of forest or the rocky outcrops of hilltops and ridges.

Behind the San Bernardino Range lies the wild "sagebrush country," bounded on the east by the Colorado River, and extending in a general northerly direction to Nevada and along the eastern base of the Sierra beyond Mono Lake.

The greater portion of this immense region, including Owen's Valley, Death Valley, and the Sink of the Mohave, the area of which is nearly one fifth that of the entire State, is usually regarded as a desert, not because of any lack in the soil, but for want of rain, and rivers available for irrigation. Very little of it, however, is desert in the eyes of a bee.

Looking now over all the available pastures of California, it appears that the business of bee-keeping is still in its infancy. Even in the more enterprising of the southern counties, where so vigorous a beginning has been made, less than a tenth of their honey resources have as yet been developed; while in the Great Plain, the coast ranges, the Sierra Nevada, and the northern region about Mount Shasta, the business can hardly be said to exist at all. What the limits of its developments in the future may be, with the advantages of cheaper transportation and the invention of better methods in general, it is not easy to guess. Nor, on the other hand, are we able to measure the influ-

ence on bee interests likely to follow the destruction of the forests, now rapidly falling before fire and the axe. As to the sheep evil, that can hardly become greater than it is at the present day. In short, notwithstanding the widespread deterioration and destruction of every kind already effected, California, with her incomparable climate and flora, is still, as far as I know, the best of all the bee lands of the world.

THE END

THE YOSEMITE

THE YOSEMITE

CHAPTER I

THE APPROACH TO THE VALLEY

When I set out on the long excursion that finally led to California, I wandered, afoot and alone, from Indiana to the Gulf of Mexico, with a plant-press on my back, holding a generally southward course, like the birds when they are going from summer to winter. From the west coast of Florida I crossed the Gulf to Cuba, enjoyed the rich tropical flora there for a few months, intending to go thence to the north end of South America, make my way through the woods to the head waters of the Amazon, and float down that grand river to the ocean. But I was unable to find a ship bound for South America — fortunately, perhaps, for I had incredibly little money for so long a trip and had not yet fully recovered from a fever caught in the Florida swamps. Therefore I decided to visit California for a year or two to see its wonderful flora and the famous Yosemite Valley. All the world was before me and every day was a holiday, so it did not seem important to which

one of the world's wildernesses I first should wander.

Arriving by the Panama steamer, I stopped one day in San Francisco and then inquired for the nearest way out of town. "But where do you want to go?" asked the man to whom I had applied for this important information. "To any place that is wild," I said. This reply startled him. He seemed to fear I might be crazy, and therefore the sooner I was out of town the better, so he directed me to the Oakland ferry.

So on the 1st of April, 1868, I set out afoot for Yosemite. It was the bloom-time of the year over the lowlands and coast ranges; the landscapes of the Santa Clara Valley were fairly drenched with sunshine, all the air was quivering with the songs of the meadowlarks, and the hills were so covered with flowers that they seemed to be painted. Slow, indeed, was my progress through these glorious gardens, the first of the California flora I had seen. Cattle and cultivation were making few scars as yet, and I wandered enchanted in long, wavering curves, knowing by my pocket map that Yosemite Valley lay to the east and that I should surely find it.

THE SIERRA FROM THE WEST

Looking eastward from the summit of the Pacheco Pass one shining morning, a landscape was displayed that after all my wanderings still appears as the most beautiful I have ever beheld. At my feet lay the Great Central Valley of California, level and flowery, like a lake of pure sunshine, forty or fifty miles wide, five hundred miles long, one rich furred garden of yellow compositæ. And from the eastern boundary of this vast golden flower-bed rose the mighty Sierra, miles in height, and so gloriously colored and so radiant, it seemed not clothed with light, but wholly composed of it, like the wall of some celestial city. Along the top and extending a good way down, was a rich pearl-gray belt of snow; below it a belt of blue and dark purple, marking the extension of the forests; and stretching along the base of the range a broad belt of rose-purple; all these colors, from the blue sky to the yellow valley smoothly blending as they do in a rainbow, making a wall of light ineffably fine. Then it seemed to me that the Sierra should be called, not the Nevada or Snowy Range, but the Range of Light. And after ten years of wandering and wondering in the heart of it, rejoicing in its glorious floods of light, the white beams of

the morning streaming through the passes, the noonday radiance on the crystal rocks, the flush of the alpenglow, and the irised spray of countless waterfalls, it still seems above all others the Range of Light.

In general views no mark of man is visible upon it, nor anything to suggest the wonderful depth and grandeur of its sculpture. None of its magnificent forest-crowned ridges seems to rise much above the general level to publish its wealth. No great valley or river is seen, or group of well-marked features of any kind standing out as distinct pictures. Even the summit peaks, marshaled in glorious array so high in the sky, seem comparatively regular in form. Nevertheless the whole range five hundred miles long is furrowed with cañons two to five thousand feet deep, in which once flowed majestic glaciers, and in which now flow and sing the bright rejoicing rivers.

CHARACTERISTICS OF THE CAÑONS

Though of such stupendous depth, these cañons are not gloomy gorges, savage and inaccessible. With rough passages here and there they are flowery pathways conducting to the snowy, icy fountains; mountain streets full of life and light, graded and sculptured by the ancient glaciers, and presenting throughout all

their courses a rich variety of novel and attractive scenery — the most attractive that has yet been discovered in the mountain ranges of the world. In many places, especially in the middle region of the western flank, the main cañons widen into spacious valleys or parks diversified like landscape gardens with meadows and groves and thickets of blooming bushes, while the lofty walls, infinitely varied in form, are fringed with ferns, flowering plants, shrubs of many species, and tall evergreens and oaks that find footholds on small benches and tables, all enlivened and made glorious with rejoicing streams that come chanting in chorus over the cliffs and through side cañons in falls of every conceivable form, to join the river that flows in tranquil, shining beauty down the middle of each one of them.

THE INCOMPARABLE YOSEMITE

The most famous and accessible of these cañon valleys, and also the one that presents their most striking and sublime features on the grandest scale, is the Yosemite, situated in the basin of the Merced River at an elevation of four thousand feet above the level of the sea. It is about seven miles long, half a mile to a mile wide, and nearly a mile deep in the solid granite flank of the range. The walls are made

up of rocks, mountains in size, partly separated from each other by side cañons, and they are so sheer in front, and so compactly and harmoniously arranged on a level floor, that the Valley, comprehensively seen, looks like an immense hall or temple lighted from above.

But no temple made with hands can compare with Yosemite. Every rock in its walls seems to glow with life. Some lean back in majestic repose; others, absolutely sheer or nearly so for thousands of feet, advance beyond their companions in thoughtful attitudes, giving welcome to storms and calms alike, seemingly aware, yet heedless, of everything going on about them. Awful in stern, immovable majesty, how softly these rocks are adorned, and how fine and reassuring the company they keep: their feet among beautiful groves and meadows, their brows in the sky, a thousand flowers leaning confidingly against their feet, bathed in floods of water, floods of light, while the snow and waterfalls, the winds and avalanches and clouds shine and sing and wreathe about them as the years go by, and myriads of small winged creatures — birds, bees, butterflies — give glad animation and help to make all the air into music. Down through the middle of the Valley flows the crystal Merced, River of Mercy, peacefully quiet,

reflecting lilies and trees and the onlooking rocks; things frail and fleeting and types of endurance meeting here and blending in countless forms, as if into this one mountain mansion Nature had gathered her choicest treasures, to draw her lovers into close and confiding communion with her.

THE APPROACH TO THE VALLEY

Sauntering up the foothills to Yosemite by any of the old trails or roads in use before the railway was built from the town of Merced up the river to the boundary of Yosemite Park, richer and wilder become the forests and streams. At an elevation of six thousand feet above the level of the sea the silver firs are two hundred feet high, with branches whorled around the colossal shafts in regular order, and every branch beautifully pinnate like a fern frond. The Douglas spruce, the yellow and sugar pines and brown-barked libocedrus here reach their finest developments of beauty and grandeur. The majestic sequoia is here, too, the king of conifers, the noblest of all the noble race. These colossal trees are as wonderful in fineness of beauty and proportion as in stature — an assemblage of conifers surpassing all that have ever yet been discovered in the forests of the world. Here, indeed, is the tree-lover's

paradise; the woods, dry and wholesome, letting in the light in shimmering masses of half sunshine, half shade; the night air as well as the day air indescribably spicy and exhilarating; plushy fir boughs for campers' beds, and cascades to sing us to sleep. On the highest ridges, over which these old Yosemite ways passed, the silver fir (*Abies magnifica*) forms the bulk of the woods, pressing forward in glorious array to the very brink of the Valley walls on both sides, and beyond the Valley to a height of from eight to nine thousand feet above the level of the sea. Thus it appears that Yosemite, presenting such stupendous faces of bare granite, is nevertheless imbedded in magnificent forests, and the main species of pine, fir, spruce, and libocedrus are also found in the Valley itself, but there are no "Big Trees" (*Sequoia gigantea*) in the Valley or about the rim of it. The nearest are about ten and twenty miles beyond the lower end of the valley on small tributaries of the Merced and Tuolumne Rivers.

THE FIRST VIEW: THE BRIDAL VEIL

From the margin of these glorious forests the first general view of the Valley used to be gained — a revelation in landscape affairs that enriches one's life forever. Entering the Valley, gazing overwhelmed with the multitude of

grand objects about us, perhaps the first to fix our attention will be the Bridal Veil, a beautiful waterfall on our right. Its brow, where it first leaps free from the cliff, is about nine hundred feet above us; and as it sways and sings in the wind, clad in gauzy, sun-sifted spray, half falling, half floating, it seems infinitely gentle and fine; but the hymns it sings tell the solemn, fateful power hidden beneath its soft clothing.

The Bridal Veil shoots free from the upper edge of the cliff by the velocity the stream has acquired in descending a long slope above the head of the fall. Looking from the top of the rock avalanche talus on the west side, about one hundred feet above the foot of the fall, the under surface of the water arch is seen to be finely grooved and striated; and the sky is seen through the arch between rock and water, making a novel and beautiful effect.

Under ordinary weather conditions the fall strikes on flat-topped slabs, forming a kind of ledge about two thirds of the way down from the top, and as the fall sways back and forth with great variety of motions among these flat-topped pillars, kissing and plashing notes as well as thunder-like detonations are produced, like those of the Yosemite Fall, though on a smaller scale.

The rainbows of the Veil, or rather the spray

and foam bows, are superb, because the waters are dashed among angular blocks of granite at the foot, producing abundance of spray of the best quality for iris effects, and also for a luxuriant growth of grass and maidenhair on the side of the talus, which lower down is planted with oak, laurel and willows.

GENERAL FEATURES OF THE VALLEY

On the other side of the Valley, almost immediately opposite the Bridal Veil, there is another fine fall, considerably wider than the Veil when the snow is melting fast and more than one thousand feet in height, measured from the brow of the cliff where it first springs out into the air to the head of the rocky talus on which it strikes and is broken up into ragged cascades. It is called the Ribbon Fall, or Virgin's Tears. During the spring floods it is a magnificent object, but the suffocating blasts of spray that fill the recess in the wall which it occupies prevent a near approach. In autumn, however, when its feeble current falls in a shower, it may then pass for tears with the sentimental onlooker fresh from a visit to the Bridal Veil.

Just beyond this glorious flood El Capitan Rock, regarded by many as the most sublime feature of the Valley, is seen through the pine groves, standing forward beyond the general

line of the wall in most imposing grandeur, a type of permanence. It is thirty-three hundred feet high, a plain, severely simple, glacier-sculptured face of granite, the end of one of the most compact and enduring of the mountain ridges, unrivaled in height and breadth and flawless strength.

Across the Valley from here, next to the Bridal Veil, are the picturesque Cathedral Rocks, nearly twenty-seven hundred feet high, making a noble display of fine yet massive sculpture. They are closely related to El Capitan, having been eroded from the same mountain ridge by the great Yosemite Glacier when the Valley was in process of formation.

Next to the Cathedral Rocks on the south side towers the Sentinel Rock to a height of more than three thousand feet, a telling monument of the glacial period.

Almost immediately opposite the Sentinel are the Three Brothers, an immense mountain mass with three gables fronting the Valley, one above another, the topmost gable nearly four thousand feet high. They were named for three brothers, sons of old Tenaya, the Yosemite chief, captured here during the Indian war, at the time of the discovery of the Valley in 1852.

Sauntering up the Valley through meadow and grove, in the company of these majestic

rocks, which seem to follow us as we advance, gazing, admiring, looking for new wonders ahead where all about us is so wonderful, the thunder of the Yosemite Fall is heard, and when we arrive in front of the Sentinel Rock it is revealed in all its glory from base to summit, half a mile in height, and seeming to spring out into the Valley sunshine direct from the sky. But even this fall, perhaps the most wonderful of its kind in the world, cannot at first hold our attention, for now the wide upper portion of the Valley is displayed to view, with the finely modeled North Dome, the Royal Arches and Washington Column on our left; Glacier Point, with its massive, magnificent sculpture on the right; and in the middle, directly in front, looms Tissiack or Half Dome, the most beautiful and most sublime of all the wonderful Yosemite rocks, rising in serene majesty from flowery groves and meadows to a height of four thousand seven hundred and fifty feet.

THE UPPER CAÑONS

Here the Valley divides into three branches, the Tenaya, Nevada, and Illilouette Cañons, extending back into the fountains of the High Sierra, with scenery every way worthy the relation they bear to Yosemite.

In the south branch, a mile or two from the

main Valley, is the Illilouette Fall, six hundred feet high, one of the most beautiful of all the Yosemite choir, but to most people inaccessible as yet on account of its rough, steep, boulder-choked cañon. Its principal fountains of ice and snow lie in the beautiful and interesting mountains of the Merced group, while its broad open basin between its fountain-mountains and cañon is noted for the beauty of its lakes and forests and magnificent moraines.

Returning to the Valley, and going up the north branch of Tenaya Cañon, we pass between the North Dome and Half Dome, and in less than an hour come to Mirror Lake, the Dome Cascades, and Tenaya Fall. Beyond the fall, on the north side of the cañon, is the sublime El Capitan-like rock called Mount Watkins; on the south the vast granite wave of Clouds' Rest, a mile in height; and between them the fine Tenaya Cascade with silvery plumes outspread on smooth glacier-polished folds of granite, making a vertical descent in all of about seven hundred feet.

Just beyond the Dome Cascades, on the shoulder of Mount Watkins, there is an old trail once used by Indians on their way across the range to Mono, but in the cañon above this point there is no trail of any sort. Between Mount Watkins and Clouds' Rest the cañon is

accessible only to mountaineers, and it is so dangerous that I hesitate to advise even good climbers, anxious to test their nerve and skill, to attempt to pass through it. Beyond the Cascades no great difficulty will be encountered. A succession of charming lily gardens and meadows occurs in filled-up lake basins among the rock waves in the bottom of the cañon, and everywhere the surface of the granite has a smooth-wiped appearance, and in many places reflects the sunbeams like glass, a phenomenon due to glacial action, the cañon having been the channel of one of the main tributaries of the ancient Yosemite Glacier.

About ten miles above the Valley we come to the beautiful Tenaya Lake, and here the cañon terminates. A mile or two above the lake stands the grand Sierra Cathedral, a building of one stone, hewn from the living rock, with sides, roof, gable, spire and ornamental pinnacles, fashioned and finished symmetrically like a work of art, and set on a well-graded plateau about nine thousand feet high, as if Nature in making so fine a building had also been careful that it should be finely seen. From every direction its peculiar form and graceful, majestic beauty of expression never fail to charm. Its height from its base to the ridge of the roof is about twenty-five hundred feet, and

among the pinnacles that adorn the front grand views may be gained of the upper basins of the Merced and Tuolumne Rivers.

Passing the Cathedral we descend into the delightful, spacious Tuolumne Valley, from which excursions may be made to Mounts Dana, Lyell, Ritter, Conness, and Mono Lake, and to the many curious peaks that rise above the meadows on the south, and to the Big Tuolumne Cañon, with its glorious abundance of rocks and falling, gliding, tossing water. For all these the beautiful meadows near the Soda Springs form a delightful center.

NATURAL FEATURES NEAR THE VALLEY

Returning now to Yosemite and ascending the middle or Nevada branch of the Valley, occupied by the main Merced River, we come within a few miles to the Vernal and Nevada Falls, four hundred and six hundred feet high, pouring their white, rejoicing waters in the midst of the most novel and sublime rock scenery to be found in all the world. Tracing the river beyond the head of the Nevada Fall we are led into the Little Yosemite, a valley like the Great Yosemite in form, sculpture and vegetation. It is about three miles long, with walls fifteen hundred to two thousand feet high, cascades coming over them, and the river

flowing through the meadows and groves of the level bottom in tranquil, richly embowered reaches.

Beyond this Little Yosemite in the main cañon, there are three other little yosemites, the highest situated a few miles below the base of Mount Lyell, at an elevation of about seventy-eight hundred feet above the sea. To describe these, with all their wealth of yosemite furniture, and the wilderness of lofty peaks above them, the home of the avalanche and treasury of the fountain snow, would take us far beyond the bounds of a single book. Nor can we here consider the formation of these mountain landscapes — how the crystal rocks were brought to light by glaciers made up of crystal snow, making beauty whose influence is so mysterious on every one who sees it.

Of the small glacier lakes so characteristic of these upper regions, there are no fewer than sixty-seven in the basin of the main middle branch, besides countless smaller pools. In the basin of the Illilouette there are sixteen, in the Tenaya basin and its branches thirteen, in the Yosemite Creek basin fourteen, and in the Pohono or Bridal Veil one, making a grand total of one hundred and eleven lakes whose waters come to sing at Yosemite. So glorious is the background of the great Valley, so har-

monious its relations to its wide-spreading fountains.

The same harmony prevails in all the other features of the adjacent landscapes. Climbing out of the Valley by the subordinate cañons, we find the ground rising from the brink of the walls: on the south side to the fountains of the Bridal Veil Creek, the basin of which is noted for the beauty of its meadows and its superb forests of silver fir; on the north side through the basin of the Yosemite Creek to the dividing ridge along the Tuolumne Cañon and the fountains of the Hoffman Range.

DOWN THE YOSEMITE CREEK

In general views the Yosemite Creek basin seems to be paved with domes and smooth, whaleback masses of granite in every stage of development — some showing only their crowns; others rising high and free above the girdling forests, singly or in groups. Others are developed only on one side, forming bold outstanding bosses usually well fringed with shrubs and trees, and presenting the polished surfaces given them by the glacier that brought them into relief. On the upper portion of the basin broad moraine beds have been deposited and on these fine, thrifty forests are growing. Lakes and meadows and small spongy bogs may be

found hiding here and there in the woods or back in the fountain recesses of Mount Hoffman, while a thousand gardens are planted along the banks of the streams.

All the wide, fan-shaped upper portion of the basin is covered with a network of small rills that go cheerily on their way to their grand fall in the Valley, now flowing on smooth pavements in sheets thin as glass, now diving under willows and laving their red roots, oozing through green, plushy bogs, plashing over small falls and dancing down slanting cascades, calming again, gliding through patches of smooth glacier meadows with sod of alpine agrostis mixed with blue and white violets and daisies, breaking, tossing among rough boulders and fallen trees, resting in calm pools, flowing together until, all united, they go to their fate with stately, tranquil gestures like a full-grown river. At the crossing of the Mono Trail, about two miles above the head of the Yosemite Fall, the stream is nearly forty feet wide, and when the snow is melting rapidly in the spring, it is about four feet deep, with a current of two and a half miles an hour. This is about the volume of water that forms the fall in May and June when there had been much snow the preceding winter; but it varies greatly from month to month. The snow rapidly vanishes from the

open portion of the basin, which faces southward, and only a few of the tributaries reach back to perennial snow and ice fountains in the shadowy amphitheaters on the precipitous northern slopes of Mount Hoffman. The total descent made by the stream from its highest sources to its confluence with the Merced in the Valley is about six thousand feet, while the distance is only about ten miles, an average fall of six hundred feet per mile. The last mile of its course lies between the sides of sunken domes and swelling folds of the granite that are clustered and pressed together like a mass of bossy cumulus clouds. Through this shining way Yosemite Creek goes to its fate, swaying and swirling with easy, graceful gestures and singing the last of its mountain songs before it reaches the dizzy edge of Yosemite to fall twenty-six hundred feet into another world, where climate, vegetation, inhabitants, all are different. Emerging from this last cañon the stream glides, in flat, lace-like folds, down a smooth incline into a small pool where it seems to rest and compose itself before taking the grand plunge. Then calmly, as if leaving a lake, it slips over the polished lip of the pool down another incline and out over the brow of the precipice in a magnificent curve thick-sown with rainbow spray.

THE YOSEMITE FALL

Long ago before I had traced this fine stream to its head back of Mount Hoffman, I was eager to reach the extreme verge to see how it behaved in flying so far through the air; but after enjoying this view and getting safely away I have never advised any one to follow my steps. The last incline down which the stream journeys so gracefully is so steep and smooth one must slip cautiously forward on hands and feet alongside the rushing water, which so near one's head is very exciting. But to gain a perfect view one must go yet farther, over a curving brow to a slight shelf on the extreme brink. This shelf, formed by the flaking off of a fold of granite, is about three inches wide, just wide enough for a safe rest for one's heels. To me it seemed nerve-trying to slip to this narrow foothold and poise on the edge of such a precipice so close to the confusing whirl of the waters; and after casting longing glances over the shining brow of the fall and listening to its sublime psalm, I concluded not to attempt to go nearer, but, nevertheless, against reasonable judgment, I did. Noticing some tufts of artemisia in a cleft of rock, I filled my mouth with the leaves, hoping their bitter taste might help to keep caution keen and prevent giddiness. In spite of

myself I reached the little ledge, got my heels well set, and worked sidewise twenty or thirty feet to a point close to the out-plunging current. Here the view is perfectly free down into the heart of the bright irised throng of comet-like streamers into which the whole ponderous volume of the fall separates, two or three hundred feet below the brow. So glorious a display of pure wildness, acting at close range while cut off from all the world beside, is terribly impressive. A less nerve-trying view may be obtained from a fissured portion of the edge of the cliff about forty yards to the eastward of the fall. Seen from this point toward noon, in the spring, the rainbow on its brow seems to be broken up and mingled with the rushing comets until all the fall is stained with iris colors, leaving no white water visible. This is the best of the safe views from above, the huge steadfast rocks, the flying waters, and the rainbow light forming one of the most glorious pictures conceivable.

The Yosemite Fall is separated into an upper and a lower fall with a series of falls and cascades between them, but when viewed in front from the bottom of the Valley they all appear as one.

So grandly does this magnificent fall display itself from the floor of the Valley, few visitors

take the trouble to climb the walls to gain nearer views, unable to realize how vastly more impressive it is near by than at a distance of one or two miles.

A WONDERFUL ASCENT

The views developed in a walk up the zigzags of the trail leading to the foot of the Upper Fall are about as varied and impressive as those displayed along the favorite Glacier Point Trail. One rises as if on wings. The groves, meadows, fern-flats and reaches of the river gain new interest, as if never seen before; all the views changing in a most striking manner as we go higher from point to point. The foreground also changes every few rods in the most surprising manner, although the earthquake talus and the level bench on the face of the wall over which the trail passes seem monotonous and commonplace as seen from the bottom of the Valley. Up we climb with glad exhilaration, through shaggy fringes of laurel, ceanothus, glossy-leaved manzanita and live-oak, from shadow to shadow across bars and patches of sunshine, the leafy openings making charming frames for the Valley pictures beheld through them, and for the glimpses of the high peaks that appear in the distance. The higher we go the farther we seem to be from the sum-

mit of the vast granite wall. Here we pass a projecting buttress whose grooved and rounded surface tells a plain story of the time when the Valley, now filled with sunshine, was filled with ice, when the grand old Yosemite Glacier, flowing river-like from its distant fountains, swept through it, crushing, grinding, wearing its way ever deeper, developing and fashioning these sublime rocks. Again we cross a white, battered gully, the pathway of rock avalanches or snow avalanches. Farther on we come to a gentle stream slipping down the face of the cliff in lace-like strips, and dropping from ledge to ledge — too small to be called a fall — trickling, dripping, oozing, a pathless wanderer from one of the upland meadows lying a little way back of the Valley rim, seeking a way century after century to the depths of the Valley without any appreciable channel. Every morning after a cool night, evaporation being checked, it gathers strength and sings like a bird, but as the day advances and the sun strikes its thin currents outspread on the heated precipices, most of its waters vanish ere the bottom of the Valley is reached. Many a fine, hanging garden aloft on breezy inaccessible heights owes to it its freshness and fullness of beauty; ferneries in shady nooks, filled with adiantum, woodwardia, woodsia, aspidium, pellæa, and cheilan-

thes, rosetted and tufted and ranged in lines, daintily overlapping, thatching the stupendous cliffs with softest beauty, some of the delicate fronds seeming to float on the warm moist air, without any connection with rock or stream. Nor is there any lack of colored plants wherever they can find a place to cling to; lilies and mints, the showy cardinal mimulus, and glowing cushions of the golden bahia, enlivened with butterflies and bees and all the other small, happy humming creatures that belong to them.

After the highest point on the lower division of the trail is gained it leads up into the deep recess occupied by the great fall, the noblest display of falling water to be found in the Valley, or perhaps in the world. When it first comes in sight it seems almost within reach of one's hand, so great in the spring is its volume and velocity, yet it is still nearly a third of a mile away and appears to recede as we advance. The sculpture of the walls about it is on a scale of grandeur, according nobly with the fall — plain and massive, though elaborately finished, like all the other cliffs about the Valley.

In the afternoon an immense shadow is cast athwart the plateau in front of the fall, and over the chaparral bushes that clothe the slopes and benches of the walls to the eastward, creeping upward until the fall is wholly overcast,

the contrast between the shaded and illumined sections being very striking in these near views.

Under this shadow, during the cool centuries immediately following the breaking-up of the glacial period, dwelt a small residual glacier, one of the few that lingered on this sun-beaten side of the Valley after the main trunk glacier had vanished. It sent down a long winding current through the narrow cañon on the west side of the fall, and must have formed a striking feature of the ancient scenery of the Valley; the lofty fall of ice and fall of water side by side, yet separate and distinct.

The coolness of the afternoon shadow and the abundant dewy spray make a fine climate for the plateau ferns and grasses, and for the beautiful azalea bushes that grow here in profusion and bloom in September, long after the warmer thickets down on the floor of the Valley have withered and gone to seed. Even close to the fall, and behind it at the base of the cliff, a few venturesome plants may be found undisturbed by the rock-shaking torrent.

The basin at the foot of the fall into which the current directly pours, when it is not swayed by the wind, is about ten feet deep and fifteen to twenty feet in diameter. That it is not much deeper is surprising, when the great height and force of the fall is considered. But

the rock where the water strikes probably suffers less erosion than it would were the descent less than half as great, since the current is outspread, and much of its force is spent ere it reaches the bottom — being received on the air as upon an elastic cushion, and borne outward and dissipated over a surface more than fifty yards wide.

This surface, easily examined when the water is low, is intensely clean and fresh looking. It is the raw, quick flesh of the mountain wholly untouched by the weather. In summer droughts, when the snowfall of the preceding winter has been light, the fall is reduced to a mere shower of separate drops without any obscuring spray. Then we may safely go back of it and view the crystal shower from beneath, each drop wavering and pulsing as it makes its way through the air, and flashing off jets of colored light of ravishing beauty. But all this is invisible from the bottom of the Valley, like a thousand other interesting things. One must labor for beauty as for bread, here as elsewhere.

THE GRANDEUR OF THE YOSEMITE FALL

During the time of the spring floods the best near view of the fall is obtained from Fern Ledge on the east side above the blinding spray at a height of about four hundred feet above

the base of the fall. A climb of about fourteen hundred feet from the Valley has to be made, and there is no trail, but to any one fond of climbing this will make the ascent all the more delightful. A narrow part of the ledge extends to the side of the fall and back of it, enabling us to approach it as closely as we wish. When the afternoon sunshine is streaming through the throng of comets, ever wasting, ever renewed, the marvelous fineness, firmness, and variety of their forms are beautifully revealed. At the top of the fall they seem to burst forth in irregular spurts from some grand, throbbing mountain heart. Now and then one mighty throb sends forth a mass of solid water into the free air far beyond the others, which rushes alone to the bottom of the fall with long streaming tail, like combed silk, while the others, descending in clusters, gradually mingle and lose their identity. But they all rush past us with amazing velocity and display of power, though apparently drowsy and deliberate in their movements when observed from a distance of a mile or two. The heads of these comet-like masses are composed of nearly solid water, and are dense white in color like pressed snow, from the friction they suffer in rushing through the air, the portion worn off forming the tail, between the white lustrous threads and films of

which faint, grayish pencilings appear, while the outer, finer sprays of water-dust, whirling in sunny eddies, are pearly gray throughout. At the bottom of the fall there is but little distinction of form visible. It is mostly a hissing, clashing, seething, upwhirling mass of scud and spray, through which the light sifts in gray and purple tones, while at times when the sun strikes at the required angle, the whole wild and apparently lawless, stormy, striving mass is changed to brilliant rainbow hues, manifesting finest harmony. The middle portion of the fall is the most openly beautiful; lower, the various forms into which the waters are wrought are more closely and voluminously veiled, while higher, toward the head, the current is comparatively simple and undivided. But even at the bottom, in the boiling clouds of spray, there is no confusion, while the rainbow light makes all divine, adding glorious beauty and peace to glorious power. This noble fall has far the richest, as well as the most powerful, voice of all the falls of the Valley, its tones varying from the sharp hiss and rustle of the wind in the glossy leaves of the live-oaks and the soft, sifting, hushing tones of the pines, to the loudest rush and roar of storm winds and thunder among the crags of the summit peaks. The low bass, booming, reverberating tones,

heard under favorable circumstances five or six miles away, are formed by the dashing and exploding of heavy masses mixed with air upon two projecting ledges on the face of the cliff, the one on which we are standing and another about two hundred feet above it. The torrent of massive comets is continuous at time of high water, while the explosive, booming notes are wildly intermittent, because, unless influenced by the wind, most of the heavier masses shoot out from the face of the precipice, and pass the ledges upon which at other times they are exploded. Occasionally the whole fall is swayed away from the front of the cliff, then suddenly dashed flat against it, or vibrated from side to side like a pendulum, giving rise to endless variety of forms and sounds.

THE NEVADA FALL

The Nevada Fall is six hundred feet high and is usually ranked next to the Yosemite in general interest among the five main falls of the Valley. Coming through the Little Yosemite in tranquil reaches, the river is first broken into rapids on a moraine boulder-bar that crosses the lower end of the Valley. Thence it pursues its way to the head of the fall in a rough, solid rock channel, dashing on side angles, heaving in heavy surging masses against elbow knobs,

and swirling and swashing in pot-holes without a moment's rest. Thus, already chafed and dashed to foam, overfolded and twisted, it plunges over the brink of the precipice as if glad to escape into the open air. But before it reaches the bottom it is pulverized yet finer by impinging upon a sloping portion of the cliff about halfway down, thus making it the whitest of all the falls of the Valley, and altogether one of the most wonderful in the world.

On the north side, close to its head, a slab of granite projects over the brink, forming a fine point for a view, over its throng of streamers and wild plunging, into its intensely white bosom, and, through the broad drifts of spray, to the river far below, gathering its spent waters and rushing on again down the cañon in glad exultation into Emerald Pool, where at length it grows calm and gets rest for what still lies before it. All the features of the view correspond with the waters in grandeur and wildness. The glacier-sculptured walls of the cañon on either hand, with the sublime mass of the Glacier Point Ridge in front, form a huge triangular pit-like basin, which, filled with the roaring of the falling river, seems as if it might be the hopper of one of the mills of the gods in which the mountains were being ground.

THE VERNAL FALL

The Vernal, about a mile below the Nevada, is four hundred feet high, a staid, orderly, graceful, easy-going fall, proper and exact in every movement and gesture, with scarce a hint of the passionate enthusiasm of the Yosemite or of the impetuous Nevada, whose chafed and twisted waters hurrying over the cliff seem glad to escape into the open air, while its deep, booming, thunder-tones reverberate over the listening landscape. Nevertheless it is a favorite with most visitors, doubtless because it is more accessible than any other, more closely approached and better seen and heard. A good stairway ascends the cliff beside it and the level plateau at the head enables one to saunter safely along the edge of the river as it comes from Emerald Pool and to watch its waters, calmly bending over the brow of the precipice, in a sheet eighty feet wide, changing in color from green to purplish gray and white until dashed on a boulder talus. Thence issuing from beneath its fine broad spray clouds we see the tremendously adventurous river still unspent, beating its way down the wildest and deepest of all its cañons in gray roaring rapids, dear to the ouzel, and below the confluence of the Illilouette, sweeping around the shoulder of the

Half Dome on its approach to the head of the tranquil levels of the Valley.

THE ILLILOUETTE FALL

The Illilouette in general appearance most resembles the Nevada. The volume of water is less than half as great, but it is about the same height (six hundred feet) and its waters receive the same kind of preliminary tossing in a rocky, irregular channel. Therefore it is a very white and fine-grained fall. When it is in full spring-time bloom it is partly divided by rocks that roughen the lip of the precipice, but this division amounts only to a kind of fluting and grooving of the column, which has a beautiful effect. It is not nearly so grand a fall as the Upper Yosemite, or so symmetrical as the Vernal, or so airily graceful and simple as the Bridal Veil, nor does it ever display so tremendous an outgush of snowy magnificence as the Nevada; but in the exquisite fineness and richness of texture of its flowing folds it surpasses them all.

One of the finest effects of sunlight on falling water I ever saw in Yosemite or elsewhere I found on the brow of this beautiful fall. It was in the Indian summer, when the leaf colors were ripe and the great cliffs and domes were transfigured in the hazy golden air. I had

scrambled up its rugged talus-dammed cañon, oftentimes stopping to take breath and look back to admire the wonderful views to be had there of the great Half Dome, and to enjoy the extreme purity of the water, which in the motionless pools on this stream is almost perfectly invisible; the colored foliage of the maples, dogwoods, rubus tangles, etc., and the late goldenrods and asters. The voice of the fall was now low, and the grand spring and summer floods had waned to sifting, drifting gauze and thin-broidered folds of linked and arrowy lace-work. When I reached the foot of the fall sunbeams were glinting across its head, leaving all the rest of it in shadow; and on its illumined brow a group of yellow spangles of singular form and beauty were playing, flashing up and dancing in large flame-shaped masses, wavering at times, then steadying, rising and falling in accord with the shifting forms of the water. But the color of the dancing spangles changed not at all. Nothing in clouds or flowers, on bird wings or the lips of shells, could rival it in fineness. It was the most divinely beautiful mass of rejoicing yellow light I ever beheld — one of Nature's precious gifts that perchance may come to us but once in a lifetime.

THE MINOR FALLS

There are many other comparatively small falls and cascades in the Valley. The most notable are the Yosemite Gorge Fall and Cascades, Tenaya Fall and Cascades, Royal Arch Falls, the two Sentinel Cascades and the falls of Cascade and Tamarack Creeks, a mile or two below the lower end of the Valley. These last are often visited. The others are seldom noticed or mentioned; although in almost any other country they would be visited and described as wonders.

The six intermediate falls in the gorge between the head of the Lower and the base of the Upper Yosemite Falls, separated by a few deep pools and strips of rapids, and three slender, tributary cascades on the west side form a series more strikingly varied and combined than any other in the Valley, yet very few of all the Valley visitors ever see them or hear of them. No available standpoint commands a view of them all. The best general view is obtained from the mouth of the gorge near the head of the Lower Fall. The two lowest of the series, together with one of the three tributary cascades, are visible from this standpoint, but in reaching it the last twenty or thirty feet of the descent is rather dangerous in time of high

water, the shelving rocks being then slippery on account of spray, but if one should chance to slip when the water is low, only a bump or two and a harmless plash would be the penalty. No part of the gorge, however, is safe to any but cautious climbers.

Though the dark gorge hall of these rejoicing waters is never flushed by the purple light of morning or evening, it is warmed and cheered by the white light of noonday, which, falling into so much foam and spray of varying degrees of fineness, makes marvelous displays of rainbow colors. So filled, indeed, is it with this precious light, at favorable times it seems to take the place of common air. Laurel bushes shed fragrance into it from above and live-oaks, those fearless mountaineers, hold fast to angular seams and lean out over it with their fringing sprays and bright mirror leaves.

One bird, the ouzel, loves this gorge and flies through it merrily, or cheerily, rather, stopping to sing on foam-washed bosses where other birds could find no rest for their feet. I have even seen a gray squirrel down in the heart of it beside the wild rejoicing water.

One of my favorite night walks was along the rim of this wild gorge in times of high water when the moon was full, to see the lunar bows in the spray.

For about a mile above Mirror Lake the Tenaya Cañon is level, and richly planted with fir, Douglas spruce and libocedrus, forming a remarkably fine grove, at the head of which is the Tenaya Fall. Though seldom seen or described, this is, I think, the most picturesque of all the small falls. A considerable distance above it, Tenaya Creek comes hurrying down, white and foamy, over a flat pavement inclined at an angle of about eighteen degrees. In time of high water this sheet of rapids is nearly seventy feet wide, and is varied in a very striking way by three parallel furrows that extend in the direction of its flow. These furrows, worn by the action of the stream upon cleavage joints, vary in width, are slightly sinuous, and have large boulders firmly wedged in them here and there in narrow places, giving rise, of course, to a complicated series of wild dashes, doublings, and upleaping arches in the swift torrent. Just before it reaches the head of the fall the current is divided, the left division making a vertical drop of about eighty feet in a romantic, leafy, flowery, mossy nook, while the other forms a rugged cascade.

The Royal Arch Fall in time of high water is a magnificent object, forming a broad ornamental sheet in front of the arches. The two Sentinel Cascades, three thousand feet high,

are also grand spectacles when the snow is melting fast in the spring, but by the middle of summer they have diminished to mere streaks scarce noticeable amid their sublime surroundings.

THE BEAUTY OF THE RAINBOWS

The Bridal Veil and Vernal Falls are famous for their rainbows; and special visits to them are often made when the sun shines into the spray at the most favorable angle. But amid the spray and foam and fine-ground mist ever rising from the various falls and cataracts there is an affluence and variety of iris bows scarcely known to visitors who stay only a day or two. Both day and night, winter and summer, this divine light may be seen wherever water is falling, dancing, singing; telling the heart-peace of Nature amid the wildest displays of her power. In the bright spring mornings the black-walled recess at the foot of the Lower Yosemite Fall is lavishly filled with irised spray; and not simply does this span the dashing foam, but the foam itself, the whole mass of it, beheld at a certain distance, seems to be colored, and drifts and wavers from color to color, mingling with the foliage of the adjacent trees, without suggesting any relationship to the ordinary rainbow. This is perhaps the largest

and most reservoir-like fountain of iris colors to be found in the Valley.

Lunar rainbows or spray-bows also abound in the glorious affluence of dashing, rejoicing, hurrahing, enthusiastic spring floods, their colors as distinct as those of the sun and regularly and obviously banded, though less vivid. Fine specimens may be found any night at the foot of the Upper Yosemite Fall, glowing gloriously amid the gloomy shadows and thundering waters, whenever there is plenty of moonlight and spray. Even the secondary bow is at times distinctly visible.

The best point from which to observe them is on Fern Ledge. For some time after moonrise, at time of high water, the arc has a span of about five hundred feet, and is set upright; one end planted in the boiling spray at the bottom, the other in the edge of the fall, creeping lower, of course, and becoming less upright as the moon rises higher. This grand arc of color, glowing in mild, shapely beauty in so weird and huge a chamber of night shadows, and amid the rush and roar and tumultuous dashing of this thunder-voiced fall, is one of the most impressive and most cheering of all the blessed mountain evangels.

Smaller bows may be seen in the gorge on the plateau between the Upper and Lower Falls.

AN UNEXPECTED ADVENTURE

Once toward midnight, after spending a few hours with the wild beauty of the Upper Fall, I sauntered along the edge of the gorge, looking in here and there, wherever the footing felt safe, to see what I could learn of the night aspects of the smaller falls that dwell there. And down in an exceedingly black, pit-like portion of the gorge, at the foot of the highest of the intermediate falls, into which the moon-beams were pouring through a narrow opening, I saw a well-defined spray-bow, beautifully distinct in colors, spanning the pit from side to side, while pure white foam-waves beneath the beautiful bow were constantly springing up out of the dark into the moonlight like dancing ghosts.

AN UNEXPECTED ADVENTURE

A wild scene, but not a safe one, is made by the moon as it appears through the edge of the Yosemite Fall when one is behind it. Once, after enjoying the night-song of the waters and watching the formation of the colored bow as the moon came round the domes and sent her beams into the wild uproar, I ventured out on the narrow bench that extends back of the fall from Fern Ledge and began to admire the dim-veiled grandeur of the view. I could see the fine gauzy threads of the fall's filmy border by

having the light in front; and wishing to look at the moon through the meshes of some of the denser portions of the fall, I ventured to creep farther behind it while it was gently wind-swayed, without taking sufficient thought about the consequences of its swaying back to its natural position after the wind-pressure should be removed. The effect was enchanting: fine, savage music sounding above, beneath, around me; while the moon, apparently in the very midst of the rushing waters, seemed to be struggling to keep her place, on account of the ever-varying form and density of the water masses through which she was seen, now darkly veiled or eclipsed by a rush of thick-headed comets, now flashing out through openings between their tails. I was in fairyland between the dark wall and the wild throng of illumined waters, but suffered sudden disenchantment; for, like the witch-scene in Alloway Kirk, "in an instant all was dark." Down came a dash of spent comets, thin and harmless-looking in the distance, but they felt desperately solid and stony when they struck my shoulders, like a mixture of choking spray and gravel and big hailstones. Instinctively dropping on my knees, I gripped an angle of the rock, curled up like a young fern frond with my face pressed against my breast, and in this attitude submit-

ted as best I could to my thundering bath. The heavier masses seemed to strike like cobble-stones, and there was a confused noise of many waters about my ears — hissing, gurgling, clashing sounds that were not heard as music. The situation was quickly realized. How fast one's thoughts burn in such times of stress! I was weighing chances of escape. Would the column be swayed a few inches away from the wall, or would it come yet closer? The fall was in flood and not so lightly would its ponderous mass be swayed. My fate seemed to depend on a breath of the "idle wind." It was moved gently forward, the pounding ceased, and I was once more visited by glimpses of the moon. But fearing I might be caught at a disadvantage in making too hasty a retreat, I moved only a few feet along the bench to where a block of ice lay. I wedged myself between the ice and the wall, and lay face downwards, until the steadiness of the light gave encouragement to rise and get away. Somewhat nerve-shaken, drenched, and benumbed, I made out to build a fire, warmed myself, ran home, reached my cabin before daylight, got an hour or two of sleep, and awoke sound and comfortable, better, not worse, for my hard midnight bath.

CLIMATE AND WEATHER

Owing to the westerly trend of the Valley and its vast depth there is a great difference between the climates of the north and south sides — greater than between many countries far apart; for the south wall is in shadow during the winter months, while the north is bathed in sunshine every clear day. Thus there is mild spring weather on one side of the Valley while winter rules the other. Far up the north-side cliffs many a nook may be found closely embraced by sun-beaten rock-bosses in which flowers bloom every month of the year. Even butterflies may be seen in these high winter gardens except when snowstorms are falling and a few days after they have ceased. Near the head of the Lower Yosemite Fall in January I found the ant lions lying in wait in their warm sand-cups, rock ferns being unrolled, club mosses covered with fresh-growing points, the flowers of the laurel nearly open, and the honeysuckle rosetted with bright young leaves; every plant seemed to be thinking about summer. Even on the shadow-side of the Valley the frost is never very sharp. The lowest temperature I ever observed during four winters was 7° Fahrenheit. The first twenty-four days of January had an average temperature at

9 A.M. of 32°, minimum 22°; at 3 P.M. the average was 40° 30′, the minimum 32°. Along the top of the walls, seven and eight thousand feet high, the temperature was, of course, much lower. But the difference in temperature between the north and south sides is due not so much to the winter sunshine as to the heat of the preceding summer, stored up in the rocks, which rapidly melts the snow in contact with them. For though summer sun-heat is stored in the rocks of the south side also, the amount is much less because the rays fall obliquely on the south wall even in summer and almost vertically on the north.

The upper branches of the Yosemite streams are buried every winter beneath a heavy mantle of snow, and set free in the spring in magnificent floods. Then, all the fountains, full and overflowing, every living thing breaks forth into singing, and the glad exulting streams, shining and falling in the warm sunny weather, shake everything into music, making all the mountain world a song.

The great annual spring thaw usually begins in May in the forest region, and in June and July on the high Sierra, varying somewhat both in time and fullness with the weather and the depth of the snow. Toward the end of summer the streams are at their lowest ebb, few

even of the strongest singing much above a whisper as they slip and ripple through gravel and boulder-beds from pool to pool in the hollows of their channels, and drop in pattering showers like rain, and slip down precipices and fall in sheets of embroidery, fold over fold. But, however low their singing, it is always ineffably fine in tone, in harmony with the restful time of the year.

The first snow of the season that comes to the help of the streams usually falls in September or October, sometimes even in the latter part of August, in the midst of yellow Indian summer, when the goldenrods and gentians of the glacier meadows are in their prime. This Indian-summer snow, however, soon melts, the chilled flowers spread their petals to the sun, and the gardens as well as the streams are refreshed as if only a warm shower had fallen. The snowstorms that load the mountains to form the main fountain supply for the year seldom set in before the middle or end of November.

WINTER BEAUTY OF THE VALLEY

When the first heavy storms stopped work on the high mountains, I made haste down to my Yosemite den, not to "hole up" and sleep the white months away; I was out every day, and often all night, sleeping but little, studying the

so-called wonders and common things ever on show, wading, climbing, sauntering among the blessed storms and calms, rejoicing in almost everything alike that I could see or hear: the glorious brightness of frosty mornings; the sunbeams pouring over the white domes and crags into the groves and waterfalls, kindling marvelous iris fires in the hoarfrost and spray; the great forests and mountains in their deep noon sleep; the good-night alpenglow; the stars; the solemn gazing moon, drawing the huge domes and headlands one by one glowing white out of the shadows hushed and breathless like an audience in awful enthusiasm, while the meadows at their feet sparkle with frost-stars like the sky; the sublime darkness of storm-nights, when all the lights are out; the clouds in whose depths the frail snow-flowers grow; the behavior and many voices of the different kinds of storms, trees, birds, waterfalls, and snow avalanches in the ever-changing weather.

Every clear, frosty morning loud sounds are heard booming and reverberating from side to side of the Valley at intervals of a few minutes, beginning soon after sunrise and continuing an hour or two like a thunderstorm. In my first winter in the Valley I could not make out the source of this noise. I thought of falling boulders, rock-blasting, etc. Not till I saw what

looked like hoarfrost dropping from the side of the fall was the problem explained. The strange thunder is made by the fall of sections of ice formed of spray that is frozen on the face of the cliff along the sides of the Upper Yosemite Fall — a sort of crystal plaster, a foot or two thick, cracked off by the sunbeams, awakening all the Valley like cock-crowing, announcing the finest weather, shouting aloud Nature's infinite industry and love of hard work in creating beauty.

EXPLORING AN ICE CONE

This frozen spray gives rise to one of the most interesting winter features of the Valley — a cone of ice at the foot of the fall, four or five hundred feet high. From the Fern Ledge standpoint its crater-like throat is seen, down which the fall plunges with deep, gasping explosions of compressed air, and, after being well churned in the stormy interior, the water bursts forth through arched openings at its base, apparently scourged and weary and glad to escape, while belching spray, spouted up out of the throat past the descending current, is wafted away in irised drifts to the adjacent rocks and groves. It is built during the night and early hours of the morning; only in spells of exceptionally cold and cloudy weather is the work continued

through the day. The greater part of the spray material falls in crystalline showers direct to its place, something like a small local snowstorm; but a considerable portion is first frozen on the face of the cliff along the sides of the fall and stays there until expanded and cracked off in irregular masses, some of them tons in weight, to be built into the walls of the cone; while in windy, frosty weather, when the fall is swayed from side to side, the cone is well drenched and the loose ice masses and spray-dust are all firmly welded and frozen together. Thus the finest of the downy wafts and curls of spray-dust, which in mild nights fall about as silently as dew, are held back until sunrise to make a store of heavy ice to reinforce the waterfall's thunder-tones.

While the cone is in process of formation, growing higher and wider in the frosty weather, it looks like a beautiful, smooth, pure-white hill; but when it is wasting and breaking up in the spring its surface is strewn with leaves, pine branches, stones, sand, etc., that have been brought over the fall, making it look like a heap of avalanche detritus.

Anxious to learn what I could about the structure of this curious hill, I often approached it in calm weather and tried to climb it, carrying an axe to cut steps. Once I nearly succeeded

in gaining the summit. At the base I was met by a current of spray and wind that made seeing and breathing difficult. I pushed on backward, however, and soon gained the slope of the hill, where by creeping close to the surface most of the choking blast passed over me and I managed to crawl up with but little difficulty. Thus I made my way nearly to the summit, halting at times to peer up through the wild whirls of spray at the veiled grandeur of the fall, or to listen to the thunder beneath me; the whole hill was sounding as if it were a huge, bellowing drum. I hoped that by waiting until the fall was blown aslant I should be able to climb to the lip of the crater and get a view of the interior; but a suffocating blast, half air, half water, followed by the fall of an enormous mass of frozen spray from a spot high up on the wall, quickly discouraged me. The whole cone was jarred by the blow and some fragments of the mass sped past me dangerously near; so I beat a hasty retreat, chilled and drenched, and lay down on a sunny rock to dry.

Once during a windstorm when I saw that the fall was frequently blown westward, leaving the cone dry, I ran up to Fern Ledge hoping to gain a clear view of the interior. I set out at noon. All the way up the storm notes were so loud about me that the voice of the fall was al-

most drowned by them. Notwithstanding the rocks and bushes everywhere were drenched by the wind-driven spray, I approached the brink of the precipice overlooking the mouth of the ice cone, but I was almost suffocated by the drenching, gusty spray, and was compelled to seek shelter. I searched for some hiding-place in the wall from whence I might run out at some opportune moment when the fall with its whirling spray and torn shreds of comet tails and trailing, tattered skirts was borne westward, as I had seen it carried several times before, leaving the cliffs on the east side and the ice hill bare in the sunlight. I had not long to wait, for, as if ordered so for my special accommodation, the mighty downrush of comets with their whirling drapery swung westward and remained aslant for nearly half an hour. The cone was admirably lighted and deserted by the water, which fell most of the time on the rocky western slopes mostly outside of the cone. The mouth into which the fall pours was, as near as I could guess, about one hundred feet in diameter north and south and about two hundred feet east and west, which is about the shape and size of the fall at its best in its normal condition at this season.

The crater-like opening was not a true oval, but more like a huge coarse mouth. I could see

down the throat about one hundred feet or perhaps farther.

The fall precipice overhangs from a height of four hundred feet above the base; therefore the water strikes some distance from the base of the cliff, allowing space for the accumulation of a considerable mass of ice between the fall and the wall.

CHAPTER II

WINTER STORMS AND SPRING FLOODS

The Bridal Veil and the Upper Yosemite Falls, on account of their height and exposure, are greatly influenced by winds. The common summer winds that come up the river cañon from the plains are seldom very strong; but the north winds do some very wild work, worrying the falls and the forests, and hanging snow-banners on the comet-peaks. One wild winter morning I was awakened by a storm-wind that was playing with the falls as if they were mere wisps of mist and making the great pines bow and sing with glorious enthusiasm. The Valley had been visited a short time before by a series of fine snowstorms, and the floor and the cliffs and all the region round about were lavishly adorned with its best winter jewelry, the air was full of fine snow-dust, and pine branches, tassels and empty cones were flying in an almost continuous flock.

Soon after sunrise, when I was seeking a place safe from flying branches, I saw the Lower Yosemite Fall thrashed and pulverized from top to bottom into one glorious mass of rainbow dust; while a thousand feet above it

the main Upper Fall was suspended on the face of the cliff in the form of an inverted bow, all silvery white and fringed with short, wavering strips. Then, suddenly assailed by a tremendous blast, the whole mass of the fall was blown into threads and ribbons, and driven back over the brow of the cliff whence it came, as if denied admission to the Valley. This kind of storm-work was continued about ten or fifteen minutes; then another change in the play of the huge exulting swirls and billows and upheaving domes of the gale allowed the baffled fall to gather and arrange its tattered waters, and sink down again in its place. As the day advanced, the gale gave no sign of dying, excepting brief lulls, the Valley was filled with its weariless roar, and the cloudless sky grew garish-white from myriads of minute, sparkling snow-spicules. In the afternoon, while I watched the Upper Fall from the shelter of a big pine tree, it was suddenly arrested in its descent at a point about halfway down, and was neither blown upward nor driven aside, but simply held stationary in mid-air, as if gravitation below that point in the path of its descent had ceased to act. The ponderous flood, weighing hundreds of tons, was sustained, hovering, hesitating, like a bunch of thistledown, while I counted one hundred and ninety. All this time the ordinary

amount of water was coming over the cliff and accumulating in the air, swedging and widening and forming an irregular cone about seven hundred feet high, tapering to the top of the wall, the whole standing still, resting on the invisible arm of the north wind. At length, as if commanded to go on again, scores of arrowy comets shot forth from the bottom of the suspended mass as if escaping from separate outlets.

The brow of El Capitan was decked with long snow-streamers like hair, Clouds' Rest was fairly enveloped in drifting gossamer films, and the Half Dome loomed up in the garish light like a majestic, living creature clad in the same gauzy, wind-woven drapery, while upward currents meeting at times overhead made it smoke like a volcano.

AN EXTRAORDINARY STORM AND FLOOD

Glorious as are these rocks and waters arrayed in storm robes, or chanting rejoicing in everyday dress, they are still more glorious when rare weather conditions meet to make them sing with floods. Only once during all the years I have lived in the Valley have I seen it in full flood bloom. In 1871 the early winter weather was delightful; the days all sunshine, the nights all starry and calm, calling forth fine

crops of frost crystals on the pines and withered ferns and grasses for the morning sunbeams to sift through. In the afternoon of December 16, when I was sauntering on the meadows, I noticed a massive crimson cloud growing in solitary grandeur above the Cathedral Rocks, its form scarcely less striking than its color. It had a picturesque, bulging base like an old sequoia, a smooth, tapering stem, and a bossy, down-curling crown like a mushroom; all its parts were colored alike, making one mass of translucent crimson. Wondering what the meaning of that strange, lonely red cloud might be, I was up betimes next morning looking at the weather, but all seemed tranquil as yet. Toward noon gray clouds with a close, curly grain like bird's-eye maple began to grow, and late at night rain fell, which soon changed to snow. Next morning the snow on the meadows was about ten inches deep, and it was still falling in a fine, cordial storm. During the night of the 18th, heavy rain fell on the snow, but as the temperature was 34°, the snow-line was only a few hundred feet above the bottom of the Valley, and one had only to climb a little higher than the tops of the pines to get out of the rainstorm into the snowstorm. The streams, instead of being increased in volume by the storm, were diminished, since the snow

sponged up part of their waters and choked the smaller tributaries. But about midnight the temperature suddenly rose to 42°, carrying the snow-line far beyond the Valley walls, and next morning Yosemite was rejoicing in a glorious flood. The comparatively warm rain falling on the snow was at first absorbed and held back, and so also was that portion of the snow that the rain melted, and all that was melted by the warm wind, until the whole mass of snow was saturated and became sludgy, and at length slipped and rushed simultaneously from a thousand slopes in wildest extravagance, heaping and swelling flood over flood, and plunging into the Valley in stupendous avalanches.

Awakened by the roar, I looked out and at once recognized the extraordinary character of the storm. The rain was still pouring in torrent abundance and the wind at gale speed was doing all it could with the flood-making rain.

The section of the north wall visible from my cabin was fairly streaked with new falls — wild roaring singers that seemed strangely out of place. Eager to get into the midst of the show, I snatched a piece of bread for breakfast and ran out. The mountain waters, suddenly liberated, seemed to be holding a grand jubilee. The two Sentinel Cascades rivaled the great falls at ordinary stages, and across the Valley

by the Three Brothers I caught glimpses of more falls than I could readily count; while the whole Valley throbbed and trembled, and was filled with an awful, massive, solemn, sea-like roar. After gazing a while enchanted with the network of new falls that were adorning and transfiguring every rock in sight, I tried to reach the upper meadows, where the Valley is widest, that I might be able to see the walls on both sides, and thus gain general views. But the river was over its banks and the meadows were flooded, forming an almost continuous lake dotted with blue sludgy islands, while innumerable streams roared like lions across my path and were sweeping forward rocks and logs with tremendous energy over ground where tiny gilias had been growing but a short time before. Climbing into the talus slopes, where these savage torrents were broken among earthquake boulders, I managed to cross them, and force my way up the Valley to Hutchings's Bridge, where I crossed the river and waded to the middle of the upper meadow. Here most of the new falls were in sight, probably the most glorious assemblage of waterfalls ever displayed from any one standpoint. On that portion of the south wall between Hutchings's and the Sentinel there were ten falls plunging and booming from a height of nearly three thousand

feet, the smallest of which might have been heard miles away. In the neighborhood of Glacier Point there were six; between the Three Brothers and Yosemite Fall, nine; between Yosemite and Royal Arch Falls, ten; from Washington Column to Mount Watkins, ten; on the slopes of Half Dome and Clouds' Rest, facing Mirror Lake and Tenaya Cañon, eight; on the shoulder of Half Dome, facing the Valley, three; fifty-six new falls occupying the upper end of the Valley, besides a countless host of silvery threads gleaming everywhere. In all the Valley there must have been upwards of a hundred. As if celebrating some great event, falls and cascades in Yosemite costume were coming down everywhere from fountain basins, far and near; and, though newcomers, they behaved and sang as if they had lived here always.

All summer visitors will remember the comet forms of the Yosemite Fall and the laces of the Bridal Veil and Nevada. In the falls of this winter jubilee the lace forms predominated, but there was no lack of thunder-toned comets. The lower portion of one of the Sentinel Cascades was composed of two main white torrents with the space between them filled in with chained and beaded gauze of intricate pattern, through the singing threads of which the pur-

plish-gray rock could be dimly seen. The series above Glacier Point was still more complicated in structure, displaying every form that one could imagine water might be dashed and combed and woven into. Those on the north wall between Washington Column and the Royal Arch Fall were so nearly related they formed an almost continuous sheet, and these again were but slightly separated from those about Indian Cañon. The group about the Three Brothers and El Capitan, owing to the topography and cleavage of the cliffs back of them, was more broken and irregular. The Tissiack Cascades were comparatively small, yet sufficient to give that noblest of mountain rocks a glorious voice. In the midst of all this extravagant rejoicing the great Yosemite Fall was scarce heard until about three o'clock in the afternoon. Then I was startled by a sudden thundering crash as if a rock avalanche had come to the help of the roaring waters. This was the flood wave of Yosemite Creek, which had just arrived, delayed by the distance it had to travel, and by the choking snows of its wide-spread fountains. Now, with volume tenfold increased beyond its springtime fullness, it took its place as leader of the glorious choir.

And the winds, too, were singing in wild accord, playing on every tree and rock, surging

against the huge brows and domes and outstanding battlements, deflected hither and thither and broken into a thousand cascading, roaring currents in the cañons, and low bass, drumming swirls in the hollows. And these again, reacting on the clouds, eroded immense cavernous spaces in their gray depths and swept forward the resulting detritus in ragged trains like the moraines of glaciers. These cloud movements in turn published the work of the winds, giving them a visible body, and enabling us to trace them. As if endowed with independent motion, a detached cloud would rise hastily to the very top of the wall as if on some important errand, examining the faces of the cliffs, and then perhaps as suddenly descend to sweep imposingly along the meadows, trailing its draggled fringes through the pines, fondling the waving spires with infinite gentleness, or, gliding behind a grove or a single tree, bringing it into striking relief, as it bowed and waved in solemn rhythm. Sometimes, as the busy clouds drooped and condensed or dissolved to misty gauze, half of the Valley would be suddenly veiled, leaving here and there some lofty headland cut off from all visible connection with the walls, looming alone, dim, spectral, as if belonging to the sky — visitors, like the new falls, come to take part in the glorious festival.

Thus for two days and nights in measureless extravagance the storm went on, and mostly without spectators, at least of a terrestrial kind. I saw nobody out — bird, bear, squirrel, or man. Tourists had vanished months before, and the hotel people and laborers were out of sight, careful about getting cold, and satisfied with views from windows. The bears, I suppose, were in their cañon-boulder dens, the squirrels in their knot-hole nests, the grouse in close fir groves, and the small singers in the Indian Cañon chaparral, trying to keep warm and dry. Strange to say, I did not see even the water-ouzels, though they must have greatly enjoyed the storm.

This was the most sublime waterfall flood I ever saw — clouds, winds, rocks, waters, throbbing together as one. And then to contemplate what was going on simultaneously with all this in other mountain temples; the Big Tuolumne Cañon — how the white waters and the winds were singing there! And in Hetch Hetchy Valley and the great King's River yosemite, and in all the other Sierra cañons and valleys from Shasta to the southernmost fountains of the Kern, thousands of rejoicing flood waterfalls chanting together in jubilee dress.

CHAPTER III

THE TREES OF THE VALLEY

THE most influential of the Valley trees is the yellow pine (*Pinus ponderosa*). It attains its noblest dimensions on beds of water-washed, coarsely-stratified moraine material, between the talus slopes and meadows, dry on the surface, well-watered below and where not too closely assembled in groves the branches reach nearly to the ground, forming grand spires two hundred to two hundred and twenty feet in height. The largest that I have measured is standing alone almost opposite the Sentinel Rock, or a little to the westward of it. It is a little over eight feet in diameter and about two hundred and twenty feet high. Climbing these grand trees, especially when they are waving and singing in worship in windstorms, is a glorious experience. Ascending from the lowest branch to the topmost is like stepping up stairs through a blaze of white light, every needle thrilling and shining as if with religious ecstasy.

Unfortunately there are but few sugar pines in the Valley, though in the King's yosemite they are in glorious abundance. The incense cedar (*Libocedrus decurrens*) with cinnamon-

colored bark and yellow-green foliage is one of the most interesting of the Yosemite trees. Some of them are one hundred and fifty feet high, from six to ten feet in diameter, and they are never out of sight as you saunter among the yellow pines. Their bright brown shafts and towers of flat, frond-like branches make a striking feature of the landscapes throughout all the seasons. In midwinter, when most of the other trees are asleep, this cedar puts forth its flowers in millions, — the pistillate pale green and inconspicuous, but the staminate bright yellow, tingeing all the branches and making the trees as they stand in the snow look like gigantic goldenrods. The branches, outspread in flat plumes and, beautifully fronded, sweep gracefully downward and outward, except those near the top, which aspire; the lowest, especially in youth and middle age, droop to the ground, overlapping one another, shedding off rain and snow like shingles, and making fine tents for birds and campers. This tree frequently lives more than a thousand years and is well worthy its place beside the great pines and the Douglas spruce.

The two largest specimens I know of the Douglas spruce, about eight feet in diameter, are growing at the foot of the Liberty Cap near the Nevada Fall, and on the terminal moraine

of the small residual glacier that lingered in the shady Illilouette Cañon.

After the conifers, the most important of the Yosemite trees are the oaks, two species; the California live-oak (*Quercus agrifolia*), with black trunk, reaching a thickness of from four to nearly seven feet, wide spreading branches and bright deeply-scalloped leaves. It occupies the greater part of the broad sandy flats of the upper end of the Valley, and is the species that yields the acorns so highly prized by the Indians and woodpeckers.

The other species is the mountain live-oak, or gold-cup oak (*Quercus chrysolepis*), a sturdy mountaineer of a tree, growing mostly on the earthquake taluses and benches of the sunny north wall of the Valley. In tough, unwedgeable, knotty strength, it is the oak of oaks, a magnificent tree.

The largest and most picturesque specimen in the Valley is near the foot of the Tenaya Fall, a romantic spot seldom seen on account of the rough trouble of getting to it. It is planted on three huge boulders and yet manages to draw sufficient moisture and food from this craggy soil to maintain itself in good health. It is twenty feet in circumference, measured above a large branch between three and four feet in diameter that has been broken off. The

main knotty trunk seems to be made up of craggy granite boulders like those on which it stands, being about the same color as the mossy, lichened boulders and about as rough. Two moss-lined caves near the ground open back into the trunk, one on the north side, the other on the west, forming picturesque, romantic seats. The largest of the main branches is eighteen feet and nine inches in circumference, and some of the long pendulous branchlets droop over the stream at the foot of the fall where it is gray with spray. The leaves are glossy yellow-green, ever in motion from the wind from the fall. It is a fine place to dream in, with falls, cascades, cool rocks lined with hypnum three inches thick; shaded with maple, dogwood, alder, willow; grand clumps of lady-ferns where no hand may touch them; light filtering through translucent leaves; oaks fifty feet high; lilies eight feet high in a filled lake basin near by, and the finest libocedrus groves and tallest ferns and goldenrods.

In the main river cañon below the Vernal Fall and on the shady south side of the Valley there are a few groves of the silver fir (*Abies concolor*), and superb forests of the magnificent species around the rim of the Valley.

On the tops of the domes is found the sturdy, storm-enduring red cedar (*Juniperus occiden-*

talis). It never makes anything like a forest here, but stands out separate and independent in the wind, clinging by slight joints to the rock, with scarce a handful of soil in sight of it, seeming to depend chiefly on snow and air for nourishment, and yet it has maintained tough health on this diet for two thousand years or more. The largest hereabouts are from five to six feet in diameter and fifty feet in height.

The principal riverside trees are poplar, alder, willow, broad-leaved maple, and Nuttall's flowering dogwood. The poplar (*Populus trichocarpa*), often called balm-of-Gilead from the gum on its buds, is a tall tree, towering above its companions and gracefully embowering the banks of the river. Its abundant foliage turns bright yellow in the fall, and the Indian-summer sunshine sifts through it in delightful tones over the slow-gliding waters when they are at their lowest ebb.

Some of the involucres of the flowering dogwood measure six to eight inches in diameter, and the whole tree when in flower looks as if covered with snow. In the spring when the streams are in flood it is the whitest of trees. In Indian summer the leaves become bright crimson, making a still grander show than the flowers.

The broad-leaved maple and the mountain

maple are found mostly in the cool cañons at the head of the Valley, spreading their branches in beautiful arches over the foaming streams.

Scattered here and there are a few other trees, mostly small — the mountain mahogany, cherry, chestnut-oak, and laurel. The California nutmeg (*Torreya californica*), a handsome evergreen, belonging to the yew family, forms small groves near the cascades a mile or two below the foot of the Valley.

CHAPTER IV

THE SOUTH DOME

With the exception of a few spires and pinnacles, the South Dome is the only rock about the Valley that is strictly inaccessible without artificial means, and its inaccessibility is expressed in severe terms. Nevertheless many a mountaineer, gazing admiringly, tried hard to invent a way to the top of its noble crown — all in vain, until in the year 1875, George Anderson, an indomitable Scotchman, undertook the adventure.

The side facing Tenaya Cañon is an absolutely vertical precipice from the summit to a depth of about sixteen hundred feet, and on the opposite side it is nearly vertical for about as great a depth. The southwest side presents a very steep and finely drawn curve from the top down a thousand feet or more, while on the northeast, where it is united with the Clouds' Rest Ridge, one may easily reach a point called the Saddle, about seven hundred feet below the summit. From the Saddle the Dome rises in a graceful curve a few degrees too steep for unaided climbing,

besides being defended by overleaning ends of the concentric dome layers of the granite.

A year or two before Anderson gained the summit, John Conway, the master trail-builder of the Valley, and his little sons, who climbed smooth rocks like lizards, made a bold effort to reach the top by climbing barefooted up the grand curve with a rope which they fastened at irregular intervals by means of eye-bolts driven into joints of the rock. But finding that the upper part would require laborious drilling, they abandoned the attempt, glad to escape from the dangerous position they had reached, some three hundred feet above the Saddle. Anderson began with Conway's old rope, which had been left in place, and resolutely drilled his way to the top, inserting eye-bolts five to six feet apart, and making his rope fast to each in succession, resting his feet on the last bolt while he drilled a hole for the next above. Occasionally some irregularity in the curve, or slight foothold, would enable him to climb a few feet without a rope, which he would pass and begin drilling again, and thus the whole work was accomplished in a few days. From this slender beginning he proposed to construct a substantial stairway which he hoped to complete in time for the next year's travel, but while busy getting out timber for his stairway

and dreaming of the wealth he hoped to gain from tolls, he was taken sick and died all alone in his little cabin.

On the 10th of November, after returning from a visit to Mount Shasta, a month or two after Anderson had gained the summit, I made haste to the Dome, not only for the pleasure of climbing, but to see what I might learn. The first winter storm clouds had blossomed and the mountains and all the high points about the Valley were mantled in fresh snow. I was, therefore, a little apprehensive of danger from the slipperiness of the rope and the rock. Anderson himself tried to prevent me from making the attempt, refusing to believe that any one could climb his rope in the snow-muffled condition in which it then was. Moreover, the sky was overcast and solemn snow clouds began to curl around the summit, and my late experiences on icy Shasta came to mind. But reflecting that I had matches in my pocket, and that I might find a little firewood, I concluded that in case of a storm the night could be spent on the Dome without any suffering worth minding, no matter what the clouds might bring forth. I therefore pushed on and gained the top.

It was one of those brooding, changeful days that come between the Indian summer and winter, when the leaf colors have grown dim

and the clouds come and go among the cliffs like living creatures looking for work: now hovering aloft, now caressing rugged rock brows with great gentleness, or, wandering afar over the tops of the forests, touching the spires of fir and pine with their soft silken fringes as if trying to tell the glad news of the coming of snow.

The first view was perfectly glorious. A massive cloud of pure pearl luster, apparently as fixed and calm as the meadows and groves in the shadow beneath it, was arched across the Valley from wall to wall, one end resting on the grand abutment of El Capitan, the other on Cathedral Rock. A little later, as I stood on the tremendous verge overlooking Mirror Lake, a flock of smaller clouds, white as snow, came from the north, trailing their downy skirts over the dark forests, and entered the Valley with solemn god-like gestures through Indian Cañon and over the North Dome and Royal Arches, moving swiftly, yet with majestic deliberation. On they came, nearer and nearer, gathering and massing beneath my feet and filling the Tenaya Cañon. Then the sun shone free, lighting the pearly gray surface of the cloud-like sea and making it glow. Gazing, admiring, I was startled to see for the first time the rare optical phenomenon of the "Specter of the Brocken." My shadow, clearly outlined, about half a

mile long, lay upon this glorious white surface with startling effect. I walked back and forth, waved my arms and struck all sorts of attitudes, to see every slightest movement enormously exaggerated. Considering that I have looked down so many times from mountain-tops on seas of all sorts of clouds, it seems strange that I should have seen the "Brocken Specter" only this once. A grander surface and a grander standpoint, however, could hardly have been found in all the Sierra.

After this grand show the cloud sea rose higher, wreathing the Dome and submerging it for a short time, making darkness like night, and I began to think of looking for a camp-ground in a cluster of dwarf pines. But soon the sun shone free again, the clouds, sinking lower and lower, gradually vanished, leaving the Valley with its Indian-summer colors apparently refreshed, while to the eastward the summit peaks, clad in new snow, towered along the horizon in glorious array.

Though apparently it is perfectly bald, there are four clumps of pines growing on the summit, representing three species, *Pinus albicaulis*, *P. contorta* and *P. ponderosa*, var. *Jeffreyi*—all three, of course, repressed and storm-beaten. The alpine spiræa grows here also and blossoms profusely with potentilla, erigeron, eriogonum,

pentstemon, solidago, an interesting species of onion, and four or five of grasses and sedges. None of these differs in any respect from those of other summits of the same height, excepting the curious little narrow-leaved, waxen-bulbed onion, which I had not seen elsewhere.

Notwithstanding the enthusiastic eagerness of tourists to reach the crown of the Dome, the views of the Valley from this lofty standpoint are less striking than from many other points comparatively low, chiefly on account of the foreshortening effect produced by looking down from so great a height. The North Dome is dwarfed almost beyond recognition, the grand sculpture of the Royal Arches is scarcely noticeable, and the whole range of walls on both sides seem comparatively low, especially when the Valley is flooded with noon sunshine; while the Dome itself, the most sublime feature of all the Yosemite views, is out of sight beneath one's feet. The view of Little Yosemite Valley is very fine, though inferior to one obtained from the base of the Starr King Cone, but the summit landscapes toward Mounts Ritter, Lyell, Dana, Conness, and the Merced group, are very effective and complete.

No one has attempted to carry out Anderson's plan of making the Dome accessible. For my part I should prefer leaving it in pure wild-

ness, though, after all, no great damage could be done by tramping over it. The surface would be strewn with tin cans and bottles, but the winter gales would blow the rubbish away. Avalanches might strip off any sort of stairway or ladder that might be built. Blue jays and Clark crows have trodden the Dome for many a day, and so have beetles and chipmunks, and Tissiack would hardly be more "conquered" or spoiled should man be added to her list of visitors. His louder scream and heavier scrambling would not stir a line of her countenance.

When the sublime ice floods of the glacial period poured down the flank of the range over what is now Yosemite Valley, they were compelled to break through a dam of domes extending across from Mount Starr King to North Dome; and as the period began to draw near a close the shallowing ice currents were divided and the South Dome was, perhaps, the first to emerge, burnished and shining like a mirror above the surface of the icy sea; and though it has sustained the wear and tear of the elements tens of thousands of years, it yet remains a telling monument of the action of the great glaciers that brought it to light. Its entire surface is still covered with glacial hieroglyphics whose interpretation is the reward of all who devoutly study them.

CHAPTER V

THE ANCIENT YOSEMITE GLACIERS: HOW THE VALLEY WAS FORMED

ALL California has been glaciated, the low plains and valleys as well as the mountains. Traces of an ice sheet, thousands of feet in thickness, beneath whose heavy folds the present landscapes have been moulded, may be found everywhere, though glaciers now exist only among the peaks of the High Sierra. No other mountain chain on this or any other of the continents that I have seen is so rich as the Sierra in bold, striking, well-preserved glacial monuments. Indeed, every feature is more or less tellingly glacial. Not a peak, ridge, dome, cañon, yosemite, lake basin, stream, or forest will you see that does not in some way explain the past existence and modes of action of flowing, grinding, sculpturing, soil-making, scenery-making ice. For, notwithstanding the post-glacial agents — the air, rain, snow, frost, river, avalanche, etc. — have been at work upon the greater portion of the range for tens of thousands of stormy years, each engraving its own characters more and more deeply over those of the ice, the latter are so enduring and so heavily

emphasized, they still rise in sublime relief, clear and legible, through every after-inscription. The landscapes of North Greenland, Antarctica, and some of those of our own Alaska, are still being fashioned beneath a slow-crawling mantle of ice, from a quarter of a mile to probably more than a mile in thickness, presenting noble illustrations of the ancient condition of California, when its sublime scenery lay hidden in process of formation. On the Himalaya, the mountains of Norway and Switzerland, the Caucasus, and on most of those of Alaska, their ice mantle has been melted down into separate glaciers that flow river-like through the valleys, illustrating a similar past condition in the Sierra, when every cañon and valley was the channel of an ice stream, all of which may be easily traced back to their fountains, where some sixty-five or seventy of their top-most residual branches still linger beneath protecting mountain shadows.

The change from one to another of those glacial conditions was slow as we count time. When the great cycle of snow years, called the glacial period, was nearly complete in California, the ice mantle, wasting from season to season faster than it was renewed, began to withdraw from the lowlands and gradually became shallower everywhere. Then the highest

of the Sierra domes and dividing ridges, containing distinct glaciers between them, began to appear above the icy sea. These first river-like glaciers remained united in one continuous sheet toward the summit of the range for many centuries. But as the snow-fall diminished, and the climate became milder, this upper part of the ice-sheet was also in turn separated into smaller distinct glaciers, and these again into still smaller ones, while at the same time all were growing shorter and shallower, though fluctuations of the climate now and then occurred that brought their receding ends to a standstill, or even enabled them to advance for a few tens or hundreds of years.

Meanwhile, hardy, home-seeking plants and animals, after long waiting, flocked to their appointed places, pushing bravely on higher and higher, along every sun-warmed slope, closely following the retreating ice, which, like shreds of summer clouds, at length vanished from the new-born mountains, leaving them in all their main, telling features nearly as we find them now.

Tracing the ways of glaciers, learning how Nature sculptures mountain waves in making scenery beauty that so mysteriously influences every human being, is glorious work.

The most striking and attractive of the gla-

cial phenomena in the Upper Yosemite region are the polished glacier pavements, because they are so beautiful, and their beauty is of so rare a kind, so unlike any portion of the loose, deeply weathered lowlands where people make homes and earn their bread. They are simply flat or gently undulating areas of hard resisting granite, which present the unchanged surface upon which with enormous pressure the ancient glaciers flowed. They are found in most perfect condition in the subalpine region, at an elevation of from eight to nine thousand feet. Some are miles in extent, only slightly interrupted by spots that have given way to the weather, while the best preserved portions reflect the sunbeams like calm water or glass, and shine as if polished afresh every day, notwithstanding they have been exposed to corroding rains, dew, frost, and snow measureless thousands of years.

The attention of wandering hunters and prospectors, who see so many mountain wonders, is seldom commanded by other glacial phenomena, moraines however regular and artificial-looking, cañons however deep or strangely modeled, rocks however high; but when they come to these shining pavements they stop and stare in wondering admiration, kneel again and again to examine the brightest spots, and try

hard to account for their mysterious shining smoothness. They may have seen the winter avalanches of snow descending in awful majesty through the woods, scouring the rocks and sweeping away like weeds the trees that stood in their way, but conclude that this cannot be the work of avalanches, because the scratches and fine polished striæ show that the agent, whatever it was, moved along the sides of high rocks and ridges and up over the tops of them as well as down their slopes. Neither can they see how water may possibly have been the agent, for they find the same strange polish upon ridges and domes thousands of feet above the reach of any conceivable flood. Of all the agents of whose work they know anything, only the wind seems capable of moving across the face of the country in the directions indicated by the scratches and grooves. The Indian name of Lake Tenaya is "Pyweak" — the lake of shining rocks. One of the Yosemite tribe, Indian Tom, came to me and asked if I could tell him what had made the Tenaya rocks so smooth. Even dogs and horses, when first led up the mountains, study geology to this extent that they gaze wonderingly at the strange brightness of the ground and smell it, and place their feet cautiously upon it as if afraid of falling or sinking.

In the production of this admirable hard finish, the glaciers in many places flowed with a pressure of more than a thousand tons to the square yard, planing down granite, slate, and quartz alike, and bringing out the veins and crystals of the rocks with beautiful distinctness. Over large areas below the sources of the Tuolumne and Merced the granite is porphyritic; feldspar crystals an inch or two in length in many places form the greater part of the rock, and these, when planed off level with the general surface, give rise to a beautiful mosaic on which the happy sunbeams plash and glow in passionate enthusiasm. Here lie the brightest of all the Sierra landscapes. The range both to the north and south of this region was, perhaps, glaciated about as heavily, but because the rocks are less resisting, their polished surfaces have mostly given way to the weather, leaving only small imperfect patches. The lowest remnants of the old glacial surface occur at an elevation of from three to five thousand feet above the sea-level, and twenty to thirty miles below the axis of the Range. The short, steeply inclined cañons of the eastern flank also contain enduring, brilliantly striated and polished rocks, but these are less magnificent than those of the broad western flank.

One of the best general views of the brightest

and best of the Yosemite park landscapes that every Yosemite tourist should see, is to be had from the top of Fairview Dome, a lofty conoidal rock near Cathedral Peak that long ago I named the Tuolumne Glacier Monument, one of the most striking and best preserved of the domes. Its burnished crown is about fifteen hundred feet above the Tuolumne Meadows and ten thousand feet above the sea. At first sight it seems inaccessible, though a good climber will find it may be scaled on the south side. About halfway up you will find it so steep that there is danger of slipping, but feldspar crystals, two or three inches long, of which the rock is full, having offered greater resistance to atmospheric erosion than the mass of the rock in which they are embedded, have been brought into slight relief in some places, roughening the surface here and there, and affording helping footholds.

The summit is burnished and scored like the sides and base, the scratches and striæ indicating that the mighty Tuolumne Glacier swept over it as if it were only a mere boulder in the bottom of its channel. The pressure it withstood must have been enormous. Had it been less solidly built it would have been carried away, ground into moraine fragments, like the adjacent rock in which it lay embedded; for,

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great as it is, it is only a hard residual knot like the Yosemite domes, brought into relief by the removal of less resisting rock about it; an illustration of the survival of the strongest and most favorably situated.

Hardly less wonderful is the resistance it has offered to the trying mountain weather since first its crown rose above the icy sea. The whole quantity of post-glacial wear and tear it has suffered has not degraded it a hundredth of an inch, as may readily be shown by the polished portions of the surface. A few erratic boulders, nicely poised on its crown, tell an interesting story. They came from the summit peaks twelve miles away, drifting like chips on the frozen sea, and were stranded here when the top of the monument merged from the ice, while their companions, whose positions chanced to be above the slopes of the sides where they could not find rest, were carried farther on by falling back on the shallowing ice current.

The general view from the summit consists of a sublime assemblage of ice-born rocks and mountains, long wavering ridges, meadows, lakes, and forest-covered moraines, hundreds of square miles of them. The lofty summit peaks rise grandly along the sky to the east, the gray pillared slopes of the Hoffman Range toward

the west, and a billowy sea of shining rocks like the Monument, some of them almost as high and which from their peculiar sculpture seem to be rolling westward in the middle ground, something like breaking waves. Immediately beneath you are the Big Tuolumne Meadows, smooth lawns with large breadths of woods on either side, and watered by the young Tuolumne River, rushing cool and clear from its many snow and ice fountains. Nearly all the upper part of the basin of the Tuolumne Glacier is in sight, one of the greatest and most influential of all the Sierra ice rivers. Lavishly flooded by many a noble affluent from the ice-laden flanks of Mounts Dana, Lyell, McClure, Gibbs, Conness, it poured its majestic outflowing current full against the end of the Hoffman Range, which divided and deflected it to right and left, just as a river of water is divided against an island in the middle of its channel. Two distinct glaciers were thus formed, one of which flowed through the great Tuolumne Cañon and Hetch Hetchy Valley, while the other swept upward in a deep current two miles wide across the divide, five hundred feet high between the basins of the Tuolumne and Merced, into the Tenaya basin, and thence down through the Tenaya Cañon and the Yosemite.

The map-like distinctness and freshness of this glacial landscape cannot fail to excite the attention of every beholder, no matter how little of its scientific significance may be recognized. These bald, westward-leaning rocks, with their rounded backs and shoulders toward the glacier fountains of the summit-mountains, and their split, angular fronts looking in the opposite direction, explain the tremendous grinding force with which the ice flood passed over them, and also the direction of its flow. And the mountain peaks around the sides of the upper general Tuolumne basin, with their sharp unglaciated summits and polished rounded sides, indicate the height to which the glaciers rose; while the numerous moraines, curving and swaying in beautiful lines, mark the boundaries of the main trunk and its tributaries as they existed toward the close of the glacial winter. None of the commercial highways of the land or sea, marked with buoys and lamps, fences, and guide-boards, is so unmistakably indicated as are these broad, shining trails of the vanished Tuolumne Glacier and its far-reaching tributaries.

I should like now to offer some nearer views of a few characteristic specimens of these wonderful old ice streams, though it is not easy to make a selection from so vast a system inti-

mately interblended. The main branches of the Merced Glacier are, perhaps, best suited to our purpose, because their basins, full of telling inscriptions, are the ones most attractive and accessible to the Yosemite visitors who like to look beyond the valley walls. They number five, and may well be called Yosemite glaciers, since they were the agents Nature used in developing and fashioning the grand Valley. The names I have given them are, beginning with the northernmost, Yosemite Creek, Hoffman, Tenaya, South Lyell, and Illilouette Glaciers. These all converged in admirable poise around from northeast to southeast, welded themselves together into the main Yosemite Glacier, which, grinding gradually deeper, swept down through the Valley, receiving small tributaries on its way from the Indian, Sentinel, and Pohono Cañons; and at length flowed out of the Valley, and on down the range in a general westerly direction. At the time that the tributaries mentioned above were well defined as to their boundaries, the upper portion of the Valley walls, and the highest rocks about them, such as the Domes, the uppermost of the Three Brothers and the Sentinel, rose above the surface of the ice. But during the Valley's earlier history, all its rocks, however lofty, were buried beneath a continuous sheet, which

swept on above and about them like the wind, the upper portion of the current flowing steadily, while the lower portion went mazing and swedging down in the crooked and dome-blocked cañons toward the head of the Valley.

Every glacier of the Sierra fluctuated in width and depth and length, and consequently in degree of individuality, down to the latest glacial days. It must, therefore, be borne in mind that the following description of the Yosemite glaciers applies only to their separate condition, and to that phase of their separate condition that they presented toward the close of the glacial period after most of their work was finished, and all the more telling features of the Valley and the adjacent region were brought into relief.

The comparatively level, many-fountained Yosemite Creek Glacier was about fourteen miles in length by four or five in width, and from five hundred to a thousand feet deep. Its principal tributaries, drawing their sources from the northern spurs of the Hoffman Range, at first pursued a westerly course; then, uniting with each other, and a series of short affluents from the western rim of the basin, the trunk thus formed swept around to the southward in a magnificent curve, and poured its ice over the north wall of Yosemite in cascades about two

miles wide. This broad and comparatively shallow glacier formed a sort of crawling, wrinkled ice-cloud, that gradually became more regular in shape and river-like as it grew older. Encircling peaks began to overshadow its highest fountains, rock islets rose here and there amid its ebbing currents, and its picturesque banks, adorned with domes and round-backed ridges, extended in massive grandeur down to the brink of the Yosemite walls.

In the mean time the chief Hoffman tributaries, slowly receding to the shelter of the shadows covering their fountains, continued to live and work independently, spreading soil, deepening lake-basins and giving finishing touches to the sculpture in general. At length these also vanished, and the whole basin is now full of light. Forests flourish luxuriantly upon its ample moraines, lakes and meadows shine and bloom amid its polished domes, and a thousand gardens adorn the banks of its streams.

It is to the great width and even slope of the Yosemite Creek Glacier that we owe the unrivaled height and sheerness of the Yosemite Falls. For had the positions of the ice fountains and the structure of the rocks been such as to cause down-thrusting concentration of the Glacier as it approached the Valley, then, in-

stead of a high vertical fall we should have had a long slanting cascade, which after all would perhaps have been as beautiful and interesting, if we only had a mind to see it so.

The short, comparatively swift-flowing Hoffman Glacier, whose fountains extend along the south slopes of the Hoffman Range, offered a striking contrast to the one just described. The erosive energy of the latter was diffused over a wide field of sunken, boulder-like domes and ridges. The Hoffman Glacier, on the contrary, moved right ahead on a comparatively even surface, making a descent of nearly five thousand feet in five miles, steadily contracting and deepening its current, and finally united with the Tenaya Glacier as one of its most influential tributaries in the development and sculpture of the great Half Dome, North Dome and the rocks adjacent to them about the head of the Valley.

The story of its death is not unlike that of its companion already described, though the declivity of its channel, and its uniform exposure to sun-heat prevented any considerable portion of its current from becoming torpid, lingering only well up on the mountain slopes to finish their sculpture and encircle them with a zone of moraine soil for forests and gardens. Nowhere in all this wonderful region will you find more

beautiful trees and shrubs and flowers covering the traces of ice.

The rugged Tenaya Glacier wildly crevassed here and there above the ridges it had to cross, instead of drawing its sources direct from the summit of the range, formed, as we have seen, one of the outlets of the great Tuolumne Glacier, issuing from this noble fountain like a river from a lake, two miles wide, about fourteen miles long, and from fifteen hundred to two thousand feet deep.

In leaving the Tuolumne region it crossed over the divide, as mentioned above, between the Tuolumne and Tenaya basins, making an ascent of five hundred feet. Hence, after contracting its wide current and receiving a strong affluent from the fountains about Cathedral Peak, it poured its massive flood over the northeastern rim of its basin in splendid cascades. Then, crushing heavily against the Clouds' Rest Ridge, it bore down upon the Yosemite dome with concentrated energy.

Toward the end of the ice period, while its Hoffman companion continued to grind rock meal for coming plants, the main trunk became torpid, and vanished, exposing wide areas of rolling rock waves and glistening pavements, on whose channelless surface water ran wild and free. And because the trunk vanished al-

most simultaneously throughout its whole extent, no terminal moraines are found in its cañon channel; nor, since its walls are, in most places, too steeply inclined to admit of the deposition of moraine matter, do we find much of the two main laterals. The lowest of its residual glaciers lingered beneath the shadow of the Yosemite Half Dome; others along the base of Coliseum Peak above Lake Tenaya and along the precipitous wall extending from the lake to the Big Tuolumne Meadows. The latter, on account of the uniformity and continuity of their protecting shadows, formed moraines of considerable length and regularity that are liable to be mistaken for portions of the left lateral of the Tuolumne tributary glacier.

Spend all the time you can spare or steal on the tracks of this grand old glacier, charmed and enchanted by its magnificent cañon, lakes and cascades, and its resplendent glacier pavements.

The Nevada Glacier was longer and more symmetrical than the last, and the only one of the Merced system whose sources extended directly back to the main summits on the axis of the range. Its numerous fountains were ranged side by side in three series, at an elevation of from ten to twelve thousand feet above the sea. The first, on the right side of the basin,

extended from the Matterhorn to Cathedral Peak; that on the left through the Merced group, and these two parallel series were united by a third that extended around the head of the basin in a direction at right angles to the others.

The three ranges of high peaks and ridges that supplied the snow for these fountains, together with the Clouds' Rest Ridge, nearly inclose a rectangular basin, that was filled with a massive sea of ice, leaving an outlet toward the west through which flowed the main trunk glacier, three fourths of a mile to a mile and a half wide, fifteen miles long, and from one thousand to fifteen hundred feet deep, and entered Yosemite between the Half Dome and Mount Starr King.

Could we have visited Yosemite Valley at this period of its history, we should have found its ice cascades vastly more glorious than their tiny water representatives of the present day. One of the grandest of these was formed by that portion of the Nevada Glacier that poured over the shoulder of the Half Dome.

This glacier, as a whole, resembled an oak, with a gnarled swelling base and wide-spreading branches. Picturesque rocks of every conceivable form adorned its banks, among which glided the numerous tributaries, mottled with

black and red and gray boulders, from the fountain peaks, while ever and anon, as the deliberate centuries passed away, dome after dome raised its burnished crown above the ice flood to enrich the slowly opening landscapes.

The principal moraines occur in short, irregular sections along the sides of the cañons, their fragmentary conditions being due to interruptions caused by portions of the sides of the canoñ walls being too steep for moraine matter to lie on, and to down-sweeping torrents and avalanches. The left lateral of the trunk may be traced about five miles from the mouth of the first main tributary to the Illilouette Cañon. The corresponding section of the right lateral, extending from Cathedral tributary to the Half Dome, is more complete because of the more favorable character of the north side of the cañon. A short side glacier came in against it from the slopes of Clouds' Rest; but being fully exposed to the sun, it was melted long before the main trunk, allowing the latter to deposit this portion of its moraine undisturbed. Some conception of the size and appearance of this fine moraine may be gained by following the Clouds' Rest Trail from Yosemite, which crosses it obliquely and conducts past several sections made by streams. Slate boulders may be seen that must have come from the Lyell

group, twelve miles distant. But the bulk of the moraine is composed of porphyritic granite derived from Feldspar and Cathedral Valleys.

On the sides of the moraines we find a series of terraces, indicating fluctuations in the level of the glacier, caused by variations of snow-fall, temperature, etc., showing that the climate of the glacial period was diversified by cycles of milder or stormier seasons similar to those of post-glacial time.

After the depth of the main trunk diminished to about five hundred feet, the greater portion became torpid, as is shown by the moraines, and lay dying in its crooked channel like a wounded snake, maintaining for a time a feeble squirming motion in places of exceptional depth, or where the bottom of the cañon was more steeply inclined. The numerous fountain-wombs, however, continued fruitful long after the trunk had vanished, giving rise to an imposing array of short residual glaciers, extending around the rim of the general basin a distance of nearly twenty-four miles. Most of these have but recently succumbed to the new climate, dying in turn as determined by elevation, size, and exposure, leaving only a few feeble survivors beneath the coolest shadows, which are now slowly completing the sculpture of one of the noblest of the Yosemite basins.

The comparatively shallow glacier that at this time filled the Illilouette basin, though once far from shallow, more resembled a lake than a river of ice, being nearly half as wide as it was long. Its greatest length was about ten miles, and its depth perhaps nowhere much exceeded one thousand feet. Its chief fountains, ranged along the west side of the Merced group, at an elevation of about ten thousand feet, gave birth to fine tributaries that flowed in a westerly direction, and united in the center of the basin. The broad trunk at first flowed northwestward, then curved to the northward, deflected by the lofty wall forming its western bank, and finally united with the grand Yosemite trunk, opposite Glacier Point.

All the phenomena relating to glacial action in this basin are remarkably simple and orderly, on account of the sheltered positions occupied by its ice-fountains, with reference to the disturbing effects of larger glaciers from the axis of the main range earlier in the period. From the eastern base of the Starr King cone you may obtain a fine view of the principal moraines sweeping grandly out into the middle of the basin from the shoulders of the peaks, between which the ice-fountains lay. The right lateral of the tributary, which took its rise between Red and Merced Mountains, measures two

hundred and fifty feet in height at its upper extremity, and displays three well-defined terraces, similar to those of the South Lyell Glacier. The comparative smoothness of the uppermost terrace shows that it is considerably more ancient than the others, many of the boulders of which it is composed having crumbled. A few miles to the westward, this moraine has an average slope of twenty-seven degrees, and an elevation above the bottom of the channel of six hundred and sixty feet. Near the middle of the main basin, just where the regularly formed medial and lateral moraines flatten out and disappear, there is a remarkably smooth field of gravel, planted with arctostaphylos, that looks at the distance of a mile like a delightful meadow. Stream sections show the gravel deposit to be composed of the same material as the moraines, but finer, and more water-worn from the action of converging torrents issuing from the tributary glaciers after the trunk was melted. The southern boundary of the basin is a strikingly perfect wall, gray on the top, and white down the sides and at the base with snow, in which many a crystal brook takes rise. The northern boundary is made up of smooth undulating masses of gray granite, that lift here and there into beautiful domes of which the Starr King cluster is the finest, while

on the east tower the majestic fountain peaks with wide cañons and *névé* amphitheaters between them, whose variegated rocks show out gloriously against the sky.

The ice ploughs of this charming basin, ranged side by side in orderly gangs, furrowed the rocks with admirable uniformity, producing irrigating channels for a brood of wild streams, and abundance of rich soil adapted to every requirement of garden and grove. No other section of the Yosemite uplands is in so perfect a state of glacial cultivation. Its domes, and peaks, and swelling rock-waves, however majestic in themselves, are yet submissively subordinate to the garden center. The other basins we have been describing are combinations of sculptured rocks, embellished with gardens and groves; the Illilouette is one grand garden and forest, embellished with rocks, each of the five beautiful in its own way, and all as harmoniously related as are the five petals of a flower. After uniting in the Yosemite Valley, and expending the down-thrusting energy derived from their combined weight and the declivity of their channels, the grand trunk flowed on through and out of the Valley. In effecting its exit a considerable ascent was made, traces of which may still be seen on the abraded rocks at the lower end of the Valley, while the direction

pursued after leaving the Valley is surely indicated by the immense lateral moraines extending from the ends of the walls at an elevation of from fifteen hundred to eighteen hundred feet. The right lateral moraine was disturbed by a large tributary glacier that occupied the basin of Cascade Creek, causing considerable complication in its structure. The left is simple in form for several miles of its length, or to the point where a tributary came in from the southeast. But both are greatly obscured by the forests and underbrush growing upon them, and by the denuding action of rains and melting snows, etc. It is, therefore, the less to be wondered at that these moraines, made up of material derived from the distant fountain mountains, and from the Valley itself, were not sooner recognized.

The ancient glacier systems of the Tuolumne, San Joaquin, Kern, and King's River basins were developed on a still grander scale and are so replete with interest that the most sketchy outline descriptions of each, with the works they have accomplished, would fill many a volume. Therefore I can do but little more than invite everybody who is free to go and see for himself.

The action of flowing ice, whether in the form of river-like glaciers or broad mantles, espe-

cially the part it played in sculpturing the earth, is as yet but little understood. Water rivers work openly where people dwell, and so does the rain, and the sea, thundering on all the shores of the world; and the universal ocean of air, though invisible, speaks aloud in a thousand voices, and explains its modes of working and its power. But glaciers, back in their white solitudes, work apart from men, exerting their tremendous energies in silence and darkness. Outspread, spirit-like, they brood above the predestined landscapes, work on unwearied through immeasurable ages, until, in the fullness of time, the mountains and valleys are brought forth, channels furrowed for rivers, basins made for lakes and meadows, and arms of the sea, soils spread for forests and fields; then they shrink and vanish like summer clouds.

CHAPTER VI

HOW BEST TO SPEND ONE'S YOSEMITE TIME

ONE-DAY EXCURSIONS

No. 1

If I were so time-poor as to have only one day to spend in Yosemite I should start at daybreak, say at three o'clock in midsummer, with a pocketful of any sort of dry breakfast stuff, for Glacier Point, Sentinel Dome, the head of Illilouette Fall, Nevada Fall, the top of Liberty Cap, Vernal Fall and the wild boulder-choked River Cañon. The trail leaves the Valley at the base of the Sentinel Rock, and as you slowly saunter from point to point along its many accommodating zigzags nearly all the Valley rocks and falls are seen in striking, ever-changing combinations. At an elevation of about five hundred feet a particularly fine, wide-sweeping view down the Valley is obtained, past the sheer face of the Sentinel and between the Cathedral Rocks and El Capitan. At a height of about fifteen hundred feet the great Half Dome comes full in sight, overshadowing every other feature of the Valley to the

eastward. From Glacier Point you look down three thousand feet over the edge of its sheer face to the meadows and groves and innumerable yellow pine spires, with the meandering river sparkling and spangling through the midst of them. Across the Valley a great telling view is presented of the Royal Arches, North Dome, Indian Cañon, Three Brothers and El Capitan, with the dome-paved basin of Yosemite Creek and Mount Hoffman in the background. To the eastward, the Half Dome close beside you looking higher and more wonderful than ever, southeastward the Starr King, girdled with silver firs, and the spacious garden-like basin of the Illilouette and its deeply sculptured fountain peaks, called the Merced group; and beyond all, marshaled along the eastern horizon, the icy summits on the axis of the range and broad swaths of forests growing on ancient moraines, while the Nevada, Vernal, and Yosemite Falls are not only full in sight, but are distinctly heard as if one were standing beside them in their spray.

The views from the summit of Sentinel Dome are still more extensive and telling. Eastward the crowds of peaks at the head of the Merced, Tuolumne, and San Joaquin Rivers are presented in bewildering array; westward, the vast forests, yellow foothills and the broad San Joa-

quin plains and the coast ranges, hazy and dim in the distance.

From Glacier Point go down the trail into the lower end of the Illilouette basin, cross Illilouette Creek and follow it to the fall, where from an out-jutting rock at its head you will get a fine view of its rejoicing waters and wild cañon and the Half Dome. Thence returning to the trail, follow it to the head of the Nevada Fall. Linger here an hour or two, for not only have you glorious views of the wonderful fall, but of its wild, leaping, exulting rapids and, greater than all, the stupendous scenery into the heart of which the white passionate river goes wildly thundering, surpassing everything of its kind in the world. After an unmeasured hour or so of this glory, all your body aglow, nerve currents flashing through you never before felt, go to the top of the Liberty Cap, only a glad saunter now that your legs as well as head and heart are awake and rejoicing with everything. The Liberty Cap, a companion of the Half Dome, is sheer and inaccessible on three of its sides but on the east a gentle, ice-burnished, juniper-dotted slope extends to the summit where other wonderful views are displayed where all are wonderful: the south side and shoulders of Half Dome and Clouds' Rest, the beautiful Little Yosemite Valley and its

many domes, the Starr King cluster of domes, Sentinel Dome, Glacier Point, and, perhaps the most tremendously impressive of all, the views of the hopper-shaped cañon of the river from the head of the Nevada Fall to the head of the Valley.

Returning to the trail you descend between the Nevada Fall and the Liberty Cap with fine side views of both the fall and the rock, pass on through clouds of spray and along the rapids to the head of the Vernal Fall, about a mile below the Nevada. Linger here if night is still distant, for views of this favorite fall and the stupendous rock scenery about it. Then descend a stairway by its side, follow a dim trail through its spray, and a plain one along the border of the boulder-dashed rapids and so back to the wide, tranquil Valley.

ONE-DAY EXCURSIONS

No. 2

Another grand one-day excursion is to the Upper Yosemite Fall, the top of the highest of the Three Brothers, called Eagle Peak on the Geological Survey maps; the brow of El Capitan; the head of the Ribbon Fall; across the beautiful Ribbon Creek basin; and back to the Valley by the Big Oak Flat wagon road.

The trail leaves the Valley on the east side of the largest of the earthquake taluses immediately opposite the Sentinel Rock and as it passes within a few rods of the foot of the great fall, magnificent views are obtained as you approach it and pass through its spray, though when the snow is melting fast you will be well drenched. From the foot of the fall the trail zigzags up a narrow cañon between the fall and a plain mural cliff that is burnished here and there by glacial action.

You should stop a while on a flat iron-fenced rock a little below the head of the fall beside the enthusiastic throng of starry comet-like waters to learn something of their strength, their marvelous variety of forms, and above all, their glorious music, gathered and composed from the snowstorms, hail-, rain- and windstorms that have fallen on their glacier-sculptured, domey, ridgy basin. Refreshed and exhilarated, you follow your trail-way through silver fir and pine woods to Eagle Peak, where the most comprehensive of all the views to be had on the north-wall heights are displayed. After an hour or two of gazing, dreaming, studying the tremendous topography, etc., trace the rim of the Valley to the grand El Capitan ridge and go down to its brow, where you will gain everlasting impressions of Nature's steadfastness and

power combined with ineffable fineness of beauty.

Dragging yourself away, go to the head of the Ribbon Fall, thence across the beautiful Ribbon Creek basin to the Big Oak Flat stage-road, and down its fine grades to the Valley, enjoying glorious Yosemite scenery all the way to the foot of El Capitan and your camp.

TWO-DAY EXCURSIONS

No. 1

For a two-day trip I would go straight to Mount Hoffman, spend the night on the summit, next morning go down by May Lake to Tenaya Lake and return to the Valley by Clouds' Rest and the Nevada and Vernal Falls. As on the foregoing excursion, you leave the Valley by the Yosemite Falls trail and follow it to the Tioga wagon road, a short distance east of Porcupine Flat. From that point push straight up to the summit. Mount Hoffman is a mass of gray granite that rises almost in the center of the Yosemite Park, about eight or ten miles in a straight line from the Valley. Its southern slopes are low and easily climbed, and adorned here and there with castle-like crumbling piles and long jagged crests that look like artificial masonry; but on the north side it is

abruptly precipitous and banked with lasting snow. Most of the broad summit is comparatively level and thick sown with crystals, quartz, mica, hornblende, feldspar, granite, zircon, tourmaline, etc., weathered out and strewn closely and loosely as if they had been sown broadcast. Their radiance is fairly dazzling in sunlight, almost hiding the multitude of small flowers that grow among them. At first sight only these radiant crystals are likely to be noticed, but looking closely you discover a multitude of very small gilias, phloxes, mimulus, etc., many of them with more petals than leaves. On the borders of little streams larger plants flourish — lupines, daisies, asters, goldenrods, hairbell, mountain columbine, potentilla, astragalus and a few gentians; with charming heathworts — bryanthus, cassiope, kalmia, vaccinium in boulder-fringing rings or bank covers. You saunter among the crystals and flowers as if you were walking among stars. From the summit nearly all the Yosemite Park is displayed like a map: forests, lakes, meadows, and snowy peaks. Northward lies Yosemite's wide basin with its domes and small lakes, shining like larger crystals; eastward the rocky, meadowy Tuolumne region, bounded by its snowy peaks in glorious array; southward Yosemite and westward the vast forest. On no

other Yosemite Park mountain are you more likely to linger. You will find it a magnificent sky camp. Clumps of dwarf pine and mountain hemlock will furnish resin roots and branches for fuel and light, and the rills, sparkling water. Thousands of the little plant people will gaze at your camp-fire with the crystals and stars, companions and guardians as you lie at rest in the heart of the vast serene night.

The most telling of all the wide Hoffman views is the basin of the Tuolumne with its meadows, forests and hundreds of smooth rock-waves that appear to be coming rolling on toward you like high heaving waves ready to break, and beyond these the great mountains. But best of all are the dawn and the sunrise. No mountain top could be better placed for this most glorious of mountain views — to watch and see the deepening colors of the dawn and the sunbeams streaming through the snowy High Sierra passes, awakening the lakes and crystals, the chilled plant people and winged people, and making everything shine and sing in pure glory.

With your heart aglow, spangling Lake Tenaya and Lake May will beckon you away for walks on their ice-burnished shores. Leave Tenaya at the west end, cross to the south side of the outlet, and gradually work your way up

in an almost straight south direction to the summit of the divide between Tenaya Creek and the main upper Merced River or Nevada Creek and follow the divide to Clouds' Rest. After a glorious view from the crest of this lofty granite wave you will find a trail on its western end that will lead you down past Nevada and Vernal Falls to the Valley in good time, provided you left your Hoffman sky camp early.

TWO-DAY EXCURSIONS

No. 2

Another grand two-day excursion is the same as the first of the one-day trips, as far as the head of Illilouette Fall. From there trace the beautiful stream up through the heart of its magnificent forests and gardens to the cañons between the Red and Merced Peaks, and pass the night where I camped forty-one years ago. Early next morning visit the small glacier on the north side of Merced Peak, the first of the sixty-five that I discovered in the Sierra.

Glacial phenomena in the Illilouette basin are on the grandest scale, and in the course of my explorations I found that the cañon and moraines between the Merced and Red Mountains were the most interesting of them all.

The path of the vanished glacier shone in many places as if washed with silver, and pushing up the cañon on this bright road I passed lake after lake in solid basins of granite and many a meadow along the cañon stream that links them together. The main lateral moraines that bound the view below the cañon are from a hundred to nearly two hundred feet high and wonderfully regular, like artificial embankments, covered with a magnificent growth of silver fir and pine. But this garden and forest luxuriance is speedily left behind, and patches of bryanthus, cassiope and arctic willows begin to appear. The small lakes which a few miles down the Valley are so richly bordered with flowery meadows have at an elevation of ten thousand feet only small brown mats of carex, leaving bare rocks around more than half their shores. Yet, strange to say, amid all this arctic repression the mountain pine on ledges and buttresses of Red Mountain seems to find the climate best suited to it. Some specimens that I measured were over a hundred feet high and twenty-four feet in circumference, showing hardly a trace of severe storms, looking as fresh and vigorous as the giants of the lower zones. Evening came on just as I got fairly into the main cañon. It is about a mile wide and a little less than two miles long. The crumbling

spurs of Red Mountain bound it on the north, the somber cliffs of Merced Mountain on the south and a deeply serrated, splintered ridge curving around from mountain to mountain shuts it in on the east. My camp was on the brink of one of the lakes in a thicket of mountain hemlock, partly sheltered from the wind. Early next morning I set out to trace the ancient glacier to its head. Passing around the north shore of my camp lake I followed the main stream from one lakelet to another. The dwarf pines and hemlocks disappeared and the stream was bordered with icicles. The main lateral moraines that extend from the mouth of the cañon are continued in straggling masses along the walls. Tracing the streams back to the highest of its little lakes, I noticed a deposit of fine gray mud, something like the mud worn from a grindstone. This suggested its glacial origin, for the stream that was carrying it issued from a raw-looking moraine that seemed to be in process of formation. It is from sixty to over a hundred feet high in front, with a slope of about thirty-eight degrees. Climbing to the top of it, I discovered a very small but well-characterized glacier swooping down from the shadowy cliffs of the mountain to its terminal moraine. The ice appeared on all the lower portion of the glacier;

farther up it was covered with snow. The uppermost crevasse or "bergeschrund" was from twelve to fourteen feet wide. The melting snow and ice formed a network of rills that ran gracefully down the surface of the glacier, merrily singing in their shining channels. After this discovery I made excursions over all the High Sierra and discovered that what at first sight looked like snow-fields were in great part glaciers which were completing the sculpture of the summit peaks.

Rising early, — which will be easy, as your bed will be rather cold and you will not be able to sleep much anyhow, — after visiting the glacier, climb the Red Mountain and enjoy the magnificent views from the summit. I counted forty lakes from one standpoint on this mountain, and the views to the westward over the Illilouette basin, the most superbly forested of all the basins whose waters drain into Yosemite, and those of the Yosemite rocks, especially the Half Dome and the upper part of the north wall, are very fine. But, of course, far the most imposing view is the vast array of snowy peaks along the axis of the Range. Then from the top of this peak, light and free and exhilarated with mountain air and mountain beauty, you should run lightly down the northern slope of the mountain, descend the cañon between Red and

Gray Mountains, thence northward along the bases of Gray Mountain and Mount Clark and go down into the head of Little Yosemite, and thence down past the Nevada and Vernal Falls to the Valley, a truly glorious two-day trip!

A THREE-DAY EXCURSION

The best three-day excursion, as far as I can see, is the same as the first of the two-day trips until you reach Lake Tenaya. There instead of returning to the Valley, follow the Tioga road around the northwest side of the lake, over to the Tuolumne Meadows and up to the west base of Mount Dana. Leave the road there and make straight for the highest point on the timber-line between Mounts Dana and Gibbs and camp there.

On the morning of the third day go to the top of Mount Dana in time for the glory of the dawn and the sunrise over the gray Mono Desert and the sublime forest of High Sierra peaks. When you leave the mountain go far enough down the north side for a view of the Dana Glacier, then make your way back to the Tioga road, follow it along the Tuolumne Meadows to the crossing of Budd Creek where you will find the Sunrise Trail branching off up the mountain-side through the forest in a southwesterly direction past the west side of Cathedral Peak,

which will lead you down to the Valley by the Vernal and Nevada Falls. If you are a good walker you can leave the trail where it begins to descend a steep slope in the silver fir woods, and bear off to the right and make straight for the top of Clouds' Rest. The walking is good and almost level and from the west end of Clouds' Rest take the Clouds' Rest Trail which will lead direct to the Valley by the Nevada and Vernal Falls. To any one not desperately time-poor this trip should have four days instead of three; camping the second night at the Soda Springs; thence to Mount Dana and return to the Soda Springs, camping the third night there; thence by the Sunrise Trail to Cathedral Peak, visiting the beautiful Cathedral Lake which lies about a mile to the west of Cathedral Peak, eating your luncheon, and thence to Clouds' Rest and the Valley as above. This is one of the most interesting of all the comparatively short trips that can be made in the whole Yosemite region. Not only do you see all the grandest of the Yosemite rocks and waterfalls and the High Sierra with their glaciers, glacier lakes and glacier meadows, etc., but sections of the magnificent silver fir, two-leaved pine, and dwarf pine zones; with the principal alpine flowers and shrubs, especially sods of dwarf vaccinium covered with flowers and fruit though less than

an inch high, broad mats of dwarf willow scarce an inch high with catkins that rise straight from the ground, and glorious beds of blue gentians, — grandeur enough and beauty enough for a lifetime.

THE UPPER TUOLUMNE EXCURSION

We come now to the grandest of all the Yosemite excursions, one that requires at least two or three weeks. The best time to make it is from about the middle of July. The visitor entering the Yosemite in July has the advantage of seeing the falls not, perhaps, in their very flood prime but next thing to it; while the glacier meadows will be in their glory and the snow on the mountains will be firm enough to make climbing safe. Long ago I made these Sierra trips, carrying only a sackful of bread with a little tea and sugar and was thus independent and free, but now that trails or carriage roads lead out of the Valley in almost every direction it is easy to take a pack animal, so that the luxury of a blanket and a supply of food can easily be had.

The best way to leave the Valley will be by the Yosemite Fall Trail, camping the first night on the Tioga road opposite the east end of the Hoffman Range. Next morning climb Mount Hoffman; thence push on past Tenaya Lake

into the Tuolumne Meadows and establish a central camp near the Soda Springs, from which glorious excursions can be made at your leisure. For here in this Upper Tuolumne Valley is the widest, smoothest, most serenely spacious, and in every way the most delightful summer pleasure-park in all the High Sierra. And since it is connected with Yosemite by two good trails, and a fairly good carriage road that passes between Yosemite and Mount Hoffman, it is also the most accessible. It is in the heart of the High Sierra east of Yosemite, eighty-five hundred to nine thousand feet above the level of the sea. The gray, picturesque Cathedral Range bounds it on the south; a similar range or spur, the highest peak of which is Mount Conness, on the north; the noble Mounts Dana, Gibbs, Mammoth, Lyell, McClure and others on the axis of the range on the east; a heaving, billowy crowd of glacier-polished rocks and Mount Hoffman on the west. Down through the open sunny meadow-levels of the Valley flows the Tuolumne River, fresh and cool from its many glacial fountains, the highest of which are the glaciers that lie on the north sides of Mount Lyell and Mount McClure.

Along the river a series of beautiful glacier meadows extend with but little interruption,

from the lower end of the Valley to its head, a distance of about twelve miles, forming charming sauntering-grounds from which the glorious mountains may be enjoyed as they look down in divine serenity over the dark forests that clothe their bases. Narrow strips of pine woods cross the meadow carpet from side to side, and it is somewhat roughened here and there by moraine boulders and dead trees brought down from the heights by snow avalanches; but for miles and miles it is so smooth and level that a hundred horsemen may ride abreast over it.

The main lower portion of the meadows is about four miles long and from a quarter to half a mile wide; but the width of the Valley is, on an average, about eight miles. Tracing the river, we find that it forks a mile above the Soda Springs, the main fork turning southward to Mount Lyell, the other eastward to Mount Dana and Mount Gibbs. Along both forks strips of meadow extend almost to their heads. The most beautiful portions of the meadows are spread over lake basins, which have been filled up by deposits from the river. A few of these river-lakes still exist, but they are now shallow and are rapidly approaching extinction. The sod in most places is exceedingly fine and silky and free from weeds and bushes; while charming flowers abound, especially gentians, dwarf

daisies, potentillas, and the pink bells of dwarf vaccinium. On the banks of the river and its tributaries cassiope and bryanthus may be found, where the sod curls over stream banks and around boulders. The principal grass of these meadows is a delicate calamagrostis with very slender filiform leaves, and when it is in flower the ground seems to be covered with a faint purple mist, the stems of the panicles being so fine that they are almost invisible, and offer no appreciable resistance in walking through them. Along the edges of the meadows beneath the pines and throughout the greater part of the Valley tall ribbon-leaved grasses grow in abundance, chiefly bromus, triticum and agrostis.

In October the nights are frosty, and then the meadows at sunrise, when every leaf is laden with crystals, are a fine sight. The days are still warm and calm, and bees and butterflies continue to waver and hum about the late-blooming flowers until the coming of the snow, usually in November. Storm then follows storm in quick succession, burying the meadows to a depth of from ten to twenty feet, while magnificent avalanches descend through the forests from the laden heights, depositing huge piles of snow mixed with uprooted trees and boulders. In the open sunshine the snow usu-

ally lasts until the end of June but the new season's vegetation is not generally in bloom until late in July. Perhaps the best all-round excursion-time after winters of average snowfall is from the middle of July to the middle or end of August. The snow is then melted from the woods and southern slopes of the mountains and the meadows and gardens are in their glory, while the weather is mostly all-reviving, exhilarating sunshine. The few clouds that rise now and then and the showers they yield are only enough to keep everything fresh and fragrant.

The groves about the Soda Springs are favorite camping-grounds on account of the cold, pleasant-tasting water charged with carbonic acid, and because of the views of the mountains across the meadow — the Glacier Monument, Cathedral Peak, Cathedral Spires, Unicorn Peak and a series of ornamental nameless companions, rising in striking forms and nearness above a dense forest growing on the left lateral moraine of the ancient Tuolumne Glacier, which, broad, deep, and far-reaching, exerted vast influence on the scenery of this portion of the Sierra. But there are fine camping grounds all along the meadows, and one may move from grove to grove every day all summer, enjoying new homes and new beauty to satisfy every roving desire for change.

UPPER TUOLUMNE EXCURSION

There are five main capital excursions to be made from here — to the summits of Mounts Dana, Lyell, and Conness, and through the Bloody Cañon Pass to Mono Lake and the volcanoes, and down the Tuolumne Cañon, at least as far as the foot of the wonderful series of river cataracts. All of these excursions are sure to be made memorable with joyful health-giving experiences; but perhaps none of them will be remembered with keener delight than the days spent in sauntering on the broad velvet lawns by the river, sharing the sky with the mountains and trees, gaining something of their strength and peace.

The excursion to the top of Mount Dana is a very easy one; for though the mountain is thirteen thousand feet high, the ascent from the west side is so gentle and smooth that one may ride a mule to the very summit. Across many a busy stream, from meadow to meadow, lies your flowery way; mountains all about you, few of them hidden by irregular foregrounds. Gradually ascending, other mountains come in sight, peak rising above peak with their snow and ice in endless variety of grouping and sculpture. Now your attention is turned to the moraines, sweeping in beautiful curves from the hollows and cañons, now to the granite waves and pavements rising here and there above the heathy

sod, polished a thousand years ago and still shining. Toward the base of the mountain you note the dwarfing of the trees, until at a height of about eleven thousand feet you find patches of the tough, white-barked pine, pressed so flat by the ten or twenty feet of snow piled upon them every winter for centuries that you may walk over them as if walking on a shaggy rug. And, if curious about such things, you may discover specimens of this hardy tree mountaineer not more than four feet high and about as many inches in diameter at the ground, that are from two hundred to four hundred years old, still holding bravely to life, making the most of their slender summers, shaking their tasseled needles in the breeze right cheerily, drinking the thin sunshine and maturing their fine purple cones as if they meant to live forever. The general view from the summit is one of the most extensive and sublime to be found in all the range. To the eastward you gaze far out over the desert plains and mountains of the "Great Basin," range beyond range extending with soft outlines, blue and purple in the distance. More than six thousand feet below you lies Lake Mono, ten miles in diameter from north to south, and fourteen from west to east, lying bare in the treeless desert like a disk of burnished metal, though at times it is swept by

mountain storm-winds and streaked with foam. To the southward there is a well-defined range of pale-gray extinct volcanoes, and though the highest of them rises nearly two thousand feet above the lake, you can look down from here into their circular, cup-like craters, from which a comparatively short time ago ashes and cinders were showered over the surrounding sage plains and glacier-laden mountains.

To the westward the landscape is made up of exceedingly strong, gray, glaciated domes and ridge-waves, most of them comparatively low, but the largest high enough to be called mountains; separated by cañons and darkened with lines and fields of forest, Cathedral Peak and Mount Hoffman in the distance; small lakes and innumerable meadows in the foreground. Northward and southward the great snowy mountains, marshaled along the axis of the range, are seen in all their glory, crowded together in some places like trees in groves, making landscapes of wild, extravagant, bewildering magnificence, yet calm and silent as the sky.

Some eight glaciers are in sight. One of these is the Dana Glacier on the north side of the mountain, lying at the foot of a precipice about a thousand feet high, with a lovely pale-green lake a little below it. This is one of the many, small, shrunken remnants of the vast glacial

system of the Sierra that once filled the hollows and valleys of the mountains and covered all the lower ridges below the immediate summit fountains, flowing to right and left away from the axis of the range, lavishly fed by the snows of the glacial period.

In the excursion to Mount Lyell the immediate base of the mountain is easily reached on meadow walks along the river. Turning to the southward above the forks of the river, you enter the narrow Lyell branch of the Valley, narrow enough and deep enough to be called a cañon. It is about eight miles long and from two to three thousand feet deep. The flat meadow bottom is from about three hundred to two hundred yards wide, with gently curved margins about fifty yards wide from which rise the simple massive walls of gray granite at an angle of about thirty-three degrees, mostly timbered with a light growth of pine and streaked in many places with avalanche channels. Toward the upper end of the cañon the Sierra crown comes in sight, forming a finely balanced picture framed by the massive cañon walls. In the foreground, when the grass is in flower, you have the purple meadow willow thickets on the river-banks; in the middle distance huge swelling bosses of granite that form the base of the general mass of the mountain,

with fringing lines of dark woods marking the lower curves, smoothly snow-clad except in the autumn.

If you wish to spend two days on the Lyell trip you will find a good camp-ground on the east side of the river, about a mile above a fine cascade that comes down over the cañon wall in telling style and makes good camp music. From here to the top of the mountains is usually an easy day's work. At one place near the summit careful climbing is necessary, but it is not so dangerous or difficult as to deter any one of ordinary skill, while the views are glorious. To the northward are Mammoth Mountain, Mounts Gibbs, Dana, Warren, Conness and others, unnumbered and unnamed; to the southeast the indescribably wild and jagged range of Mount Ritter and the Minarets; southwestward stretches the dividing ridge between the north fork of the San Joaquin and the Merced, uniting with the Obelisk or Merced group of peaks that form the main fountains of the Illilouette branch of the Merced; and to the northwestward extends the Cathedral spur. These spurs like distinct ranges meet at your feet; therefore you look them mostly in the direction of their extension, and their peaks seem to be massed and crowded against one another, while immense amphitheaters, cañons

and subordinate ridges with their wealth of lakes, glaciers, and snow-fields, maze and cluster between them. In making the ascent in June or October the glacier is easily crossed, for then its snow mantle is smooth or mostly melted off. But in midsummer the climbing is exceedingly tedious because the snow is then weathered into curious and beautiful blades, sharp and slender, and set on edge in a leaning position. They lean toward the head of the glacier and extend across from side to side in regular order in a direction at right angles to the direction of greatest declivity, the distance between the crests being about two or three feet, and the depth of the troughs between them about three feet. A more interesting problem than a walk over a glacier thus sculptured and adorned is seldom presented to the mountaineer.

The Lyell Glacier is about a mile wide and less than a mile long, but presents, nevertheless, all the essential characters of large, river-like glaciers — moraines, earth-bands, blue veins, crevasses, etc., while the streams that issue from it are, of course, turbid with rock mud, showing its grinding action on its bed. And it is all the more interesting since it is the highest and most enduring remnant of the great Tuolumne Glacier, whose traces are still distinct fifty miles away, and whose influence

on the landscape was so profound. The McClure Glacier, once a tributary of the Lyell, is smaller. Thirty-eight years ago I set a series of stakes in it to determine its rate of motion. Towards the end of summer in the middle of the glacier it was only a little over an inch in twenty-four hours.

The trip to Mono from the Soda Springs can be made in a day, but many days may profitably be spent near the shores of the lake, out on its islands and about the volcanoes.

In making the trip down the Big Tuolumne Cañon, animals may be led as far as a small, grassy, forested lake basin that lies below the crossing of the Virginia Creek Trail. And from this point any one accustomed to walking on earthquake boulders, carpeted with cañon chaparral, can easily go down as far as the big cascades and return to camp in one day. Many, however, are not able to do this, and it is better to go leisurely, prepared to camp anywhere, and enjoy the marvelous grandeur of the place.

The canoñ begins near the lower end of the meadows and extends to the Hetch Hetchy Valley, a distance of about eighteen miles, though it will seem much longer to any one who scrambles through it. It is from twelve hundred to about five thousand feet deep, and is

comparatively narrow, but there are several roomy, park-like openings in it, and throughout its whole extent Yosemite features are displayed on a grand scale — domes, El Capitan rocks, gables, Sentinels, Royal Arches, Glacier Points, Cathedral Spires, etc. There is even a Half Dome among its wealth of rock forms, though far less sublime than the Yosemite Half Dome. Its falls and cascades are innumerable. The sheer falls, except when the snow is melting in early spring, are quite small in volume as compared with those of Yosemite and Hetch Hetchy; though in any other country many of them would be regarded as wonders. But it is the cascades or sloping falls on the main river that are the crowning glory of the cañon, and these in volume, extent and variety surpass those of any other cañon in the Sierra. The most showy and interesting of them are mostly in the upper part of the cañon, above the point of entrance of Cathedral Creek and Hoffman Creek. For miles the river is one wild, exulting, on-rushing mass of snowy purple bloom, spreading over glacial waves of granite without any definite channel, gliding in magnificent silver plumes, dashing and foaming through huge boulder-dams, leaping high into the air in wheel-like whirls, displaying glorious enthusiasm, tossing from side to side, doubling,

glinting, singing in exuberance of mountain energy.

Every one who is anything of a mountaineer should go on through the entire length of the cañon, coming out by Hetch Hetchy. There is not a dull step all the way. With wide variations, it is a Yosemite Valley from end to end.

Besides these main, far-reaching, much-seeing excursions from the main central camp, there are numberless lovely little saunters and scrambles and a dozen or so not so very little. Among the best of these are to Lambert and Fair View Domes; to the topmost spires of Cathedral Peak, and to those of the North Church, around the base of which you pass on your way to Mount Conness; to one of the very loveliest of the glacier meadows embedded in the pine woods about three miles north of the Soda Springs, where forty-two years ago I spent six weeks. It trends east and west, and you can find it easily by going past the base of Lambert's Dome to Dog Lake and thence up northward through the woods about a mile or so; to the shining rock-waves full of ice-burnished, feldspar crystals at the foot of the meadows; to Lake Tenaya; and, last but not least, a rather long and very hearty scramble down by the end of the meadow along the Tioga road toward Lake Tenaya to the crossing of Cathe-

dral Creek, where you turn off and trace the creek down to its confluence with the Tuolumne. This is a genuine scramble much of the way but one of the most wonderfully telling in its glacial rock forms and inscriptions.

If you stop and fish at every tempting lake and stream you come to, a whole month, or even two months, will not be too long for this grand High Sierra excursion. My own Sierra trip was ten years long.

OTHER TRIPS FROM THE VALLEY

Short carriage trips are usually made in the early morning to Mirror Lake to see its wonderful reflections of the Half Dome and Mount Watkins; and in the afternoon many ride down the Valley to see the Bridal Veil rainbows or up the river cañon to see those of the Vernal Fall; where, standing in the spray, not minding getting drenched, you may see what are called round rainbows, when the two ends of the ordinary bow are lengthened and meet at your feet, forming a complete circle which is broken and united again and again as determined by the varying wafts of spray. A few ambitious scramblers climb to the top of the Sentinel Rock, others walk or ride down the Valley and up to the once-famous Inspiration Point for a last grand view; while a good many appreciative

tourists, who have only a day or two, do no climbing or riding but spend their time sauntering on the meadows by the river, watching the falls, and the play of light and shade among the rocks from morning to night, perhaps gaining more than those who make haste up the trails in large noisy parties. Those who have unlimited time find something worth while all the year round on every accessible part of the vast, deeply sculptured walls. At least so I have found it after making the Valley my home for years.

Here are a few specimens selected from my own short trips which walkers may find useful.

One, up the river cañon, across the bridge between the Vernal and Nevada Falls, through chaparral beds and boulders to the shoulder of Half Dome, along the top of the shoulder to the dome itself, down by a crumbling slot gully and close along the base of the tremendous split front (the most awfully impressive, sheer, precipice view I ever found in all my cañon wanderings), thence up the east shoulder and along the ridge to Clouds' Rest — a glorious sunset — then a grand starry run back home to my cabin; down through the junipers, down through the firs, now in black shadows, now in white light, past roaring Nevada and Vernal, glowering ghost-like beneath their huge frowning cliffs;

down the dark, gloomy cañon, through the pines of the Valley, dreamily murmuring in their calm, breezy sleep — a fine wild little excursion for good legs and good eyes — so much sun-, moon- and star-shine in it, and sublime, up-and-down rhythmical, glacial topography.

Another, to the head of Yosemite Fall by Indian Cañon; thence up the Yosemite Creek, tracing it all the way to its highest sources back of Mount Hoffman, then a wide sweep around the head of its dome-paved basin, passing its many little lakes and bogs, gardens and groves, trilling, warbling rills, and back by the Fall Cañon. This was one of my Sabbath walk, run-and-slide excursions long ago before any trail had been made on the north side of the Valley.

Another fine trip was up, bright and early, by Avalanche Cañon to Glacier Point, along the rugged south wall, tracing all its far outs and ins to the head of the Bridal Veil Fall, thence back home, bright and late, by a brushy, bouldery slope between Cathedral rocks and Cathedral spires and along the level Valley floor. This was one of my long, bright-day and bright-night walks thirty or forty years ago when, like river and ocean currents, time flowed undivided, uncounted — a fine free, sauntery,

scrambly, botanical, beauty-filled ramble. The walk up the Valley was made glorious by the marvelous brightness of the morning star. So great was her light, she made every tree cast a well-defined shadow on the smooth sandy ground.

Everybody who visits Yosemite wants to see the famous Big Trees. Before the railroad was constructed, all three of the stage-roads that entered the Valley passed through a grove of these trees by the way; namely, the Tuolumne, Merced, and Mariposa Groves. The Tuolumne Grove was passed on the Big Oak Flat road, the Merced Grove by the Coulterville road, and the Mariposa Grove by the Raymond and Wawona road. Now, to see any one of these groves, a special trip has to be made. Most visitors go to the Mariposa Grove, the largest of the three. On this sequoia trip you see, not only the giant Big Trees, but magnificent forests of silver fir, sugar pine, yellow pine, libocedrus, and Douglas spruce. The trip need not require more than two days, spending a night in a good hotel at Wawona, a beautiful place on the south fork of the Merced River, and returning to the Valley or to El Portal, the terminus of the railroad. This extra trip by stage costs fifteen dollars. All the High Sierra excursions that I have sketched cost from a

dollar a week to anything you like. None of mine when I was exploring the Sierra cost over a dollar a week, most of them less.

EARLY HISTORY OF THE VALLEY

In the wild gold years of 1849 and '50, the Indian tribes along the western Sierra foothills became alarmed at the sudden invasion of their acorn orchard and game fields by miners, and soon began to make war upon them, in their usual murdering, plundering style. This continued until the United States Indian Commissioners succeeded in gathering them into reservations, some peacefully, others by burning their villages and stores of food. The Yosemite or Grizzly Bear tribe, fancying themselves secure in their deep mountain stronghold, were the most troublesome and defiant of all, and it was while the Mariposa battalion, under command of Major Savage, was trying to capture this warlike tribe and conduct them to the Fresno reservation, that their deep mountain home, the Yosemite Valley, was discovered. From a camp on the south fork of the Merced, Major Savage sent Indian runners to the bands who were supposed to be hiding in the mountains, instructing them to tell the Indians that if they would come in and make treaty with the Commissioners they would be furnished with

food and clothing and be protected, but if they did not come in he would make war upon them and kill them all. None of the Yosemite Indians responded to this general message, but when a special messenger was sent to the chief, he appeared the next day. He came entirely alone and stood in dignified silence before one of the guards until invited to enter the camp. He was recognized by one of the friendly Indians as Tenaya, the old chief of the Grizzlies, and, after he had been supplied with food, Major Savage, with the aid of Indian interpreters, informed him of the wishes of the Commissioners. But the old chief was very suspicious of Savage and feared that he was taking this method of getting the tribe into his power for the purpose of revenging his personal wrong. Savage told him, if he would go to the Commissioners and make peace with them as the other tribes had done, there would be no more war. Tenaya inquired what was the object of taking all the Indians to the San Joaquin plain. "My people," said he, "do not want anything from the Great Father you tell me about. The Great Spirit is our father and he has always supplied us with all we need. We do not want anything from white men. Our women are able to do our work. Go, then. Let us remain in the mountains where we were born, where the ashes of

our fathers have been given to the wind. I have said enough."

To this the Major answered abruptly in Indian style: "If you and your people have all you desire, why do you steal our horses and mules? Why do you robe the miners' camps? Why do you murder the white men and plunder and burn their houses?"

Tenaya was silent for some time. He evidently understood what the Major had said, for he replied, "My young men have sometimes taken horses and mules from the whites. This was wrong. It is not wrong to take the property of enemies who have wronged my people. My young men believed that the gold-diggers were our enemies. We now know they are not and we shall be glad to live in peace with them. We will stay here and be friends. My people do not want to go to the plains. Some of the tribes who have gone there are very bad. We cannot live with them. Here we can defend ourselves."

To this Major Savage firmly said, "Your people must go to the Commissioners. If they do not your young men will again steal horses and kill and plunder the whites. It was your people who robbed my stores, burned my houses and murdered my men. If they do not make a treaty, your whole tribe will be destroyed. Not one of them will be left alive."

To this the old chief replied, "It is useless to talk to you about who destroyed your property and killed your people. I am old and you can kill me if you will, but it is useless to lie to you who know more than all the Indians. Therefore I will not lie to you, but if you will let me return to my people I will bring them in." He was allowed to go. The next day he came back and said his people were on the way to our camp to go with the men sent by the Great Father, who was so good and rich.

Another day passed, but no Indians from the deep Valley appeared. The old chief said that the snow was so deep and his village was so far down that it took a long time to climb out of it. After waiting still another day, the expedition started for the Valley. When Tenaya was questioned as to the route and distance, he said that the snow was so deep that the horses could not go through it. Old Tenaya was taken along as guide. When the party had gone about halfway to the Valley, they met the Yosemites on their way to the camp on the south fork. There were only seventy-two of them, and when the old chief was asked what had become of the rest of his band, he replied, "This is all of my people that are willing to go with me to the plains. All the rest have gone with their wives and children over the mountains to the Mono

and Tuolumne tribes." Savage told Tenaya that he was not telling the truth, for Indians could not cross the mountains in the deep snow, and that he knew they must still be at his village or hiding somewhere near it. The tribe had been estimated to number over two hundred. Major Savage then said to him, "You may return to camp with your people and I will take one of your young men with me to your village to see your people who will not come. They will come if I find them." "You will not find any of my people there," said Tenaya; "I do not know where they are. My tribe is small. Many of the people of my tribe have come from other tribes and if they go to the plains and are seen they will be killed by the friends of those with whom they have quarreled. I was told that I was growing old and it was well that I should go, but that young and strong men can find plenty in the mountains: therefore, why should they go to the hot plains to be penned up like horses and cattle? My heart has been sore since that talk, but I am now willing to go, for it is best for my people."

Pushing ahead, taking turns in breaking a way through the snow, they arrived in sight of the great Valley early in the afternoon and, guided by one of Tenaya's Indians, descended by the same route as that followed by the Mari-

posa Trail, and the weary party went into camp on the river-bank opposite El Capitan. After supper, seated around a big fire, the wonderful Valley became the topic of conversation and Dr. Bunell suggested giving it a name. Many were proposed, but after a vote had been taken the name Yosemite, proposed by Dr. Bunell, was adopted almost unanimously to perpetuate the name of the tribe who so long had made their home there. The Indian name of the Valley, however, is Ahwahnee. The Indians had names for all the different rocks and streams of the Valley, but very few of them are now in use by the whites, Pohono, the Bridal Veil, being the principal one. The expedition remained only one day and two nights in the Valley, hurrying out on the approach of a storm and reached the south-fork headquarters on the evening of the third day after starting out. Thus, in three days the round trip had been made to the Valley, most of it had been explored in a general way, and some of its principal features had been named. But the Indians had fled up the Tenaya Cañon Trail and none of them were seen, except an old woman unable to follow the fugitives.

A second expedition was made in the same year under command of Major Boling. When the Valley was entered, no Indians were seen,

but the many wigwams with smouldering fires showed that they had been hurriedly abandoned that very day. Later, five young Indians who had been left to watch the movements of the expedition were captured at the foot of the Three Brothers after a lively chase. Three of the five were sons of the old chief and the rock was named for them. All of these captives made good their escape within a few days, except the youngest son of Tenaya, who was shot by his guard while trying to escape. That same day the old chief was captured on the cliff on the east side of Indian Cañon by some of Boling's scouts. As Tenaya walked toward the camp his eye fell upon the dead body of his favorite son. Captain Boling, through an interpreter, expressed his regret at the occurrence, but not a word did Tenaya utter in reply. Later, he made an attempt to escape, but was caught as he was about to swim across the river. Tenaya expected to be shot for this attempt, and when brought into the presence of Captain Boling he said in great emotion, "Kill me, Sir Captain, yes, kill me as you killed my son, as you would kill my people if they were to come to you. You would kill all my tribe if you had the power. Yes, Sir America, you can now tell your warriors to kill the old chief. You have made my life dark with sorrow. You

killed the child of my heart. Why not kill the father? But wait a little and when I am dead I will call my people to come and they shall hear me in their sleep and come to avenge the death of their chief and his son. Yes, Sir America, my spirit will make trouble for you and your people, as you have made trouble to me and my people. With the wizards I will follow the white people and make them fear me. You may kill me, Sir Captain, but you shall not live in peace. I will follow in your footsteps. I will not leave my home, but be with the spirits among the rocks, the waterfalls, in the rivers and in the winds; wherever you go I will be with you. You will not see me but you will fear the spirit of the old chief and grow cold. The Great Spirit has spoken. I am done."

This expedition finally captured the remnants of the tribes at the head of Lake Tenaya and took them to the Fresno reservation, together with their chief, Tenaya. But after a short stay they were allowed to return to the Valley under restrictions. Tenaya promised faithfully to conform to everything required, joyfully left the hot and dry reservation, and with his family returned to his Yosemite home.

The following year a party of miners was attacked by the Indians in the Valley and two of them were killed. This led to another Yosemite

expedition. A detachment of regular soldiers from Fort Miller, under Lieutenant Moore, was at once dispatched to capture or punish the murderers. Lieutenant Moore entered the Valley in the night and surprised and captured a party of five Indians, but an alarm was given and Tenaya and his people fled from their huts and escaped to the Monos on the east side of the range. On examination of the five prisoners in the morning it was discovered that each of them had some article of clothing that belonged to the murdered men. The bodies of the two miners were found and buried on the edge of the Bridal Veil meadow. When the captives were accused of the murder of the two white men, they admitted that they had killed them to prevent white men from coming to their Valley, declaring that it was their home and that white men had no right to come there without their consent. Lieutenant Moore told them through his interpreter that they had sold their lands to the Government, that it belonged to the white men now, and that they had agreed to live on the reservation provided for them. To this they replied that Tenaya had never consented to the sale of their Valley and had never received pay for it. The other chief, they said, had no right to sell their territory. The lieutenant, being fully satisfied that he had

captured the real murderers, promptly pronounced judgment and had them placed in line and shot. Lieutenant Moore pursued the fugitives to Mono, but was not successful in finding any of them. After being hospitably entertained and protected by the Mono and Paiute tribes, they stole a number of stolen horses from their entertainers and made their way by a long, obscure route by the head of the north fork of the San Joaquin, reached their Yosemite home once more, but early one morning, after a feast of horse-flesh, a band of Monos surprised them in their huts, killing Tenaya and nearly all his tribe. Only a small remnant escaped down the river cañon. The Tenaya Cañon and Lake were named for the famous old chief.

Very few visits were made to the Valley before the summer of 1855, when Mr. J. M. Hutchings, having heard of its wonderful scenery, collected a party and made the first regular tourist's visit to the Yosemite and in his California magazine described it in articles illustrated by a good artist, who was taken into the Valley by him for that purpose. This first party was followed by another from Mariposa the same year, consisting of sixteen or eighteen persons. The next year the regular pleasure travel began and a trail on the Mariposa side

of the Valley was opened by Mann Brothers. This trail was afterwards purchased by the citizens of the county and made free to the public. The first house built in the Yosemite Valley was erected in the autumn of 1856 and was kept as a hotel the next year by G. A. Hite and later by J. H. Neal and S. M. Cunningham. It was situated directly opposite the Yosemite Fall. A little over half a mile farther up the Valley a canvas house was put up in 1858 by G. A. Hite. Next year a frame house was built and kept as a hotel by Mr. Peck, afterward by Mr. Longhurst and since 1864 by Mr. Hutchings. All these hotels have vanished except the frame house built in 1859, which has been changed beyond recognition. A large hotel built on the brink of the river in front of the old one is now the only hotel in the Valley. A large hotel built by the State, and located farther up the Valley, was burned. To provide for the overflow of visitors there are three camps with board floors, wood frame, and covered with canvas, well furnished, some of them with electric light. A large first-class hotel is very much needed.

Travel of late years has been rapidly increasing, especially after the establishment, by Act of Congress in 1890, of the Yosemite National Park and the recession in 1905 of the original reservation to the Federal Government

by the State. The greatest increase, of course, was caused by the construction of the Yosemite Valley Railroad from Merced to the border of the Park, eight miles below the Valley.

It is eighty miles long, and the entire distance, except the first twenty-four miles from the town of Merced, is built through the precipitous Merced River Cañon. The roadbed was virtually blasted out of the solid rock for the entire distance in the cañon. Work was begun in September, 1905, and the first train entered El Portal, the terminus, April 15, 1907. Many miles of the road cost as much as one hundred thousand dollars per mile. Its business has increased from four thousand tourists in the first year it was operated to fifteen thousand in 1910.

CHAPTER VII

LAMON

THE good old pioneer, Lamon, was the first of all the early Yosemite settlers who cordially and unreservedly adopted the Valley as his home.

He was born in the Shenandoah Valley, Virginia, May 10, 1817, emigrated to Illinois with his father, John Lamon, at the age of nineteen; afterwards went to Texas and settled on the Brazos, where he raised melons and hunted alligators for a living. "Right interestin' business," he said, "especially the alligator part of it." From the Brazos he went to the Comanche Indian country between Gonzales and Austin, twenty miles from his nearest neighbor. During the first summer, the only bread he had was the breast meat of wild turkeys. When the formidable Comanche Indians were on the war-path he left his cabin after dark and slept in the woods. From Texas he crossed the plains to California and worked in the Calaveras and Mariposa gold-fields.

He first heard Yosemite spoken of as a very beautiful mountain valley and after making two excursions in the summers of 1857 and

1858 to see the wonderful place, he made up his mind to quit roving and make a permanent home in it. In April, 1859, he moved into it, located a garden opposite the Half Dome, set out a lot of apple, pear and peach trees, planted potatoes, etc., that he had packed in on a "contrary old mule," and worked for his board in building a hotel which was afterwards purchased by Mr. Hutchings. His neighbors thought he was very foolish in attempting to raise crops in so high and cold a valley, and warned him that he could raise nothing and sell nothing, and would surely starve.

For the first year or two lack of provisions compelled him to move out on the approach of winter, but in 1862, after he had succeeded in raising some fruit and vegetables, he began to winter in the Valley.

The first winter he had no companions, not even a dog or cat, and one evening was greatly surprised to see two men coming up the Valley. They were very glad to see him, for they had come from Mariposa in search of him, a report having been spread that he had been killed by Indians. He assured his visitors that he felt safer in his Yosemite home, lying snug and squirrel-like in his 10 x 12 cabin than in Mariposa. When the avalanches began to slip, he wondered where all the wild roaring and boom-

ing came from, the flying snow preventing them from being seen. But, upon the whole, he wondered most at the brightness, gentleness, and sunniness of the weather, and hopefully employed the calm days in clearing ground for an orchard and vegetable garden.

In the second winter he built a winter cabin under the Royal Arches, where he enjoyed more sunshine. But no matter how he praised the weather he could not induce any one to winter with him until 1864.

He liked to describe the great flood of 1867, the year before I reached California, when all the walls were striped with thundering waterfalls.

He was a fine, erect, whole-souled man, between six and seven feet high, with a broad, open face, bland and guileless as his pet oxen. No stranger to hunger and weariness, he knew well how to appreciate suffering of a like kind in others, and many there be, myself among the number, who can testify to his simple, unostentatious kindness that found expression in a thousand small deeds.

After gaining sufficient means to enjoy a long afternoon of life in comparative affluence and ease, he died in the autumn of 1876. He sleeps in a beautiful spot near Galen Clark and a monument hewn from a block of Yosemite granite marks his grave.

CHAPTER VIII

GALEN CLARK

GALEN CLARK was the best mountaineer I ever met, and one of the kindest and most amiable of all my mountain friends. I first met him at his Wawona ranch forty-three years ago on my first visit to Yosemite. I had entered the Valley with one companion by way of Coulterville, and returned by what was then known as the Mariposa Trail. Both trails were buried in deep snow where the elevation was from five to seven thousand feet above sea-level in the sugar pine and silver fir regions. We had no great difficulty, however, in finding our way by the trends of the main features of the topography. Botanizing by the way, we made slow, plodding progress, and were again about out of provisions when we reached Clark's hospitable cabin at Wawona. He kindly furnished us with flour and a little sugar and tea, and my companion, who complained of the benumbing poverty of a strictly vegetarian diet, gladly accepted Mr. Clark's offer of a piece of a bear that had just been killed. After a short talk about bears and the forests and the way to the Big Trees, we pushed on up through the Wawona firs and

sugar pines, and camped in the now famous Mariposa Grove.

Later, after making my home in the Yosemite Valley, I became well acquainted with Mr. Clark, while he was guardian. He was elected again and again to this important office by different Boards of Commissioners on account of his efficiency and his real love of the Valley.

Although nearly all my mountaineering has been done without companions, I had the pleasure of having Galen Clark with me on three excursions. About thirty-five years ago I invited him to accompany me on a trip through the Big Tuolumne Cañon from Hetch Hetchy Valley. The cañon up to that time had not been explored, and knowing that the difference in the elevation of the river at the head of the cañon and in Hetch Hetchy was about five thousand feet, we expected to find some magnificent cataracts or falls; nor were we disappointed. When we were leaving Yosemite an ambitious young man begged leave to join us. I strongly advised him not to attempt such a long, hard trip, for it would undoubtedly prove very trying to an inexperienced climber. He assured us, however, that he was equal to anything, would gladly meet every difficulty as it came, and cause us no hindrance or trouble of any sort. So at last, after repeating our advice

that he give up the trip, we consented to his joining us. We entered the cañon by way of Hetch Hetchy Valley, each carrying his own provisions, and making his own tea, porridge, bed, etc.

In the morning of the second day out from Hetch Hetchy, we came to what is now known as "Muir Gorge," and Mr. Clark without hesitation prepared to force a way through it, wading and jumping from one submerged boulder to another through the torrent, bracing and steadying himself with a long pole. Though the river was then rather low, the savage, roaring, surging song it was singing was rather nerve-trying, especially to our inexperienced companion. With careful assistance, however, I managed to get him through, but this hard trial, naturally enough, proved too much, and he informed us, pale and trembling, that he could go no farther. I gathered some wood at the upper throat of the gorge, made a fire for him, and advised him to feel at home and make himself comfortable, hoped he would enjoy the grand scenery and the songs of the water-ouzels which haunted the gorge, and assured him that we would return some time in the night, though it might be late, as we wished to go on through the entire cañon if possible. We pushed our way through the dense chaparral and over the

earthquake taluses with such speed that we reached the foot of the upper cataract while we had still an hour or so of daylight for the return trip. It was long after dark when we reached our adventurous but nerve-shaken companion, who, of course, was anxious and lonely, not being accustomed to solitude, however kindly and flowery and full of sweet bird song and stream song. Being tired we simply lay down in restful comfort on the river-bank beside a good fire, instead of trying to go down the gorge in the dark or climb over its high shoulder to our blankets and provisions, which we had left in the morning in a tree at the foot of the gorge. I remember Mr. Clark remarking that if he had his choice that night between provisions and blankets, he would choose his blankets.

The next morning in about an hour we had crossed over the ridge through which the gorge is cut, reached our provisions, made tea, and had a good breakfast. As soon as we had returned to Yosemite, I obtained fresh provisions, pushed off alone up to the head of Yosemite Creek basin, entered the cañon by a side cañon, and completed the exploration up to the Tuolumne Meadows.

It was on this first trip from Hetch Hetchy to the upper cataracts that I had convincing proofs of Mr. Clark's daring and skill as a

mountaineer, particularly in fording torrents, and in forcing his way through thick chaparral. I found it somewhat difficult to keep up with him in dense, tangled brush, though in jumping on boulder taluses and slippery cobble-beds I had no difficulty in leaving him behind.

After I had discovered the glaciers on Mount Lyell and Mount McClure, Mr. Clark kindly made a second excursion with me to assist in establishing a line of stakes across the McClure Glacier to measure its rate of flow. On this trip we also climbed Mount Lyell together, when the snow which covered the glacier was melted into upleaning, icy blades which were extremely difficult to cross, not being strong enough to support our weight, nor wide enough apart to enable us to stride across each blade as it was met. Here again I, being lighter, had no difficulty in keeping ahead of him. While resting after wearisome staggering and falling he stared at the marvelous ranks of leaning blades, and said, "I think I have traveled all sorts of trails and cañons, through all kinds of brush and snow, but this gets me."

Mr. Clark at my urgent request joined my small party on a trip to the King's River Yosemite by way of the high mountains, most of the way without a trail. He joined us at the Mariposa Big Tree Grove and intended to go

all the way, but finding that, on account of the difficulties encountered, the time required was much greater than he expected, he turned back near the head of the north fork of the King's River.

In cooking his mess of oatmeal porridge and making tea, his pot was always the first to boil, and I used to wonder why, with all his skill in scrambling through brush in the easiest way, and preparing his meals, he was so utterly careless about his beds. He would lie down anywhere on any ground, rough or smooth, without taking pains even to remove cobbles or sharp-angled rocks protruding through the grass or gravel, saying that his own bones were as hard as any stones and could do him no harm.

His kindness to all Yosemite visitors and mountaineers was marvelously constant and uniform. He was not a good business man, and in building an extensive hotel and barns at Wawona, before the travel to Yosemite had been greatly developed, he borrowed money, mortgaged his property and lost it all.

Though not the first to see the Mariposa Big Tree Grove, he was the first to explore it, after he had heard from a prospector, who had passed through the grove and who gave him the indefinite information, that there were some wonderful big trees up there on the top of

the Wawona Hill and that he believed they must be of the same kind that had become so famous and well known in the Calaveras Grove farther north. On this information, Galen Clark told me, he went up and thoroughly explored the grove, counting the trees and measuring the largest, and becoming familiar with it. He stated also that he had explored the forest to the southward and had discovered the much larger Fresno Grove of about two square miles, six or seven miles distant from the Mariposa Grove. Unfortunately most of the Fresno Grove has been cut and flumed down to the railroad near Madera.

Mr. Clark was truly and literally a gentleman. I never heard him utter a hasty, angry, fault-finding word. His voice was uniformly pitched at a rather low tone, perfectly even, although glances of his eyes and slight intonations of his voice often indicated that something funny or mildly sarcastic was coming, but upon the whole he was serious and industrious, and, however deep and fun-provoking a story might be, he never indulged in boisterous laughter.

He was very fond of scenery and once told me after I became acquainted with him that he liked "nothing in the world better than climbing to the top of a high ridge or mountain and

looking off." He preferred the mountain ridges and domes in the Yosemite regions on account of the wealth and beauty of the forests. Oftentimes he would take his rifle, a few pounds of bacon, a few pounds of flour, and a single blanket and go off hunting, for no other reason than to explore and get acquainted with the most beautiful points of view within a journey of a week or two from his Wawona home. On these trips he was always alone and could indulge in tranquil enjoyment of Nature to his heart's content. He said that on those trips, when he was a sufficient distance from home in a neighborhood where he wished to linger, he always shot a deer, sometimes a grouse, and occasionally a bear. After diminishing the weight of a deer or bear by eating part of it, he carried as much as possible of the best of the meat to Wawona, and from his hospitable well-supplied cabin no weary wanderer ever went away hungry or unrested.

The value of the mountain air in prolonging life is well exemplified in Mr. Clark's case. While working in the mines he contracted a severe cold that settled on his lungs and finally caused severe inflammation and bleeding, and none of his friends thought he would ever recover. The physicians told him he had but a short time to live. It was then that he repaired

to the beautiful sugar pine woods at Wawona and took up a claim, including the fine meadows there, and building his cabin, began his life of wandering and exploring in the glorious mountains about him, usually going bareheaded. In a remarkably short time his lungs were healed.

He was one of the most sincere tree-lovers I ever knew. About twenty years before his death he made choice of a plot in the Yosemite cemetery on the north side of the Valley, not far from the Yosemite Fall, and selecting a dozen or so of seedling sequoias in the Mariposa Grove he brought them to the Valley and planted them around the spot he had chosen for his last rest. The ground there is gravelly and dry; by careful watering he finally nursed most of the seedlings into good, thrifty trees, and doubtless they will long shade the grave of their blessed lover and friend.

CHAPTER IX

HETCH HETCHY VALLEY

YOSEMITE is so wonderful that we are apt to regard it as an exceptional creation, the only valley of its kind in the world; but Nature is not so poor as to have only one of anything. Several other yosemites have been discovered in the Sierra that occupy the same relative positions on the range and were formed by the same forces in the same kind of granite. One of these, the Hetch Hetchy Valley, is in the Yosemite National Park, about twenty miles from Yosemite, and is easily accessible to all sorts of travelers by a road and trail that leaves the Big Oak Flat road at Bronson Meadows a few miles below Crane Flat, and to mountaineers by way of Yosemite Creek basin and the head of the middle fork of the Tuolumne.

It is said to have been discovered by Joseph Screech, a hunter, in 1850, a year before the discovery of the great Yosemite. After my first visit to it in the autumn of 1871, I have always called it the "Tuolumne Yosemite," for it is a wonderfully exact counterpart of the Merced Yosemite, not only in its sublime rocks and waterfalls but in the gardens, groves and mead-

ows of its flowery park-like floor. The floor of Yosemite is about four thousand feet above the sea; the Hetch Hetchy floor about thirty-seven hundred feet. And as the Merced River flows through Yosemite, so does the Tuolumne through Hetch Hetchy. The walls of both are of gray granite, rise abruptly from the floor, are sculptured in the same style and in both every rock is a glacier monument.

Standing boldly out from the south wall is a strikingly picturesque rock called by the Indians, Kolana, the outermost of a group twenty-three hundred feet high, corresponding with the Cathedral Rocks of Yosemite both in relative position and form. On the opposite side of the Valley, facing Kolana, there is a counterpart of El Capitan that rises sheer and plain to a height of eighteen hundred feet, and over its massive brow flows a stream which makes the most graceful fall I have ever seen. From the edge of the cliff to the top of an earthquake talus it is perfectly free in the air for a thousand feet before it is broken into cascades among talus boulders. It is in all its glory in June, when the snow is melting fast, but fades and vanishes toward the end of summer. The only fall I know with which it may fairly be compared is the Yosemite Bridal Veil; but it excels even that favorite fall both in height and airy-

fairy beauty and behavior. Lowlanders are apt to suppose that mountain streams in their wild career over cliffs lose control of themselves and tumble in a noisy chaos of mist and spray. On the contrary, on no part of their travels are they more harmonious and self-controlled. Imagine yourself in Hetch Hetchy on a sunny day in June, standing waist-deep in grass and flowers (as I have often stood), while the great pines sway dreamily with scarcely perceptible motion. Looking northward across the Valley you see a plain, gray granite cliff rising abruptly out of the gardens and groves to a height of eighteen hundred feet, and in front of it Tueeulala's silvery scarf burning with irised sun-fire. In the first white outburst at the head there is abundance of visible energy, but it is speedily hushed and concealed in divine repose, and its tranquil progress to the base of the cliff is like that of a downy feather in a still room. Now observe the fineness and marvelous distinctness of the various sun-illumined fabrics into which the water is woven; they sift and float from form to form down the face of that grand gray rock in so leisurely and unconfused a manner that you can examine their texture, and patterns and tones of color as you would a piece of embroidery held in the hand. Toward the top of the fall you see groups of booming,

comet-like masses, their solid, white heads separate, their tails like combed silk interlacing among delicate gray and purple shadows, ever forming and dissolving, worn out by friction in their rush through the air. Most of these vanish a few hundred feet below the summit, changing to varied forms of cloud-like drapery. Near the bottom the width of the fall has increased from about twenty-five feet to a hundred feet. Here it is composed of yet finer tissues, and is still without a trace of disorder — air, water and sunlight woven into stuff that spirits might wear.

So fine a fall might well seem sufficient to glorify any valley; but here, as in Yosemite, Nature seems in nowise moderate, for a short distance to the eastward of Tueeulala booms and thunders the great Hetch Hetchy Fall, Wapama, so near that you have both of them in full view from the same standpoint. It is the counterpart of the Yosemite Fall, but has a much greater volume of water, is about seventeen hundred feet in height, and appears to be nearly vertical, though considerably inclined, and is dashed into huge outbounding bosses of foam on projecting shelves and knobs. No two falls could be more unlike — Tueeulala out in the open sunshine descending like thistledown; Wapama in a jagged, shadowy gorge

roaring and thundering, pounding its way like an earthquake avalanche.

Besides this glorious pair there is a broad, massive fall on the main river a short distance above the head of the Valley. Its position is something like that of the Vernal in Yosemite, and its roar as it plunges into a surging trout-pool may be heard a long way, though it is only about twenty feet high. On Rancheria Creek, a large stream, corresponding in position with the Yosemite Tenaya Creek, there is a chain of cascades joined here and there with swift flashing plumes like the one between the Vernal and Nevada Falls, making magnificent shows as they go their glacier-sculptured way, sliding, leaping, hurrahing, covered with crisp clashing spray made glorious with sifting sunshine. And besides all these a few small streams come over the walls at wide intervals, leaping from ledge to ledge with bird-like song and watering many a hidden cliff-garden and fernery, but they are too unshowy to be noticed in so grand a place.

The correspondence between the Hetch Hetchy walls in their trends, sculpture, physical structure, and general arrangement of the main rock-masses and those of the Yosemite Valley has excited the wondering admiration of every observer. We have seen that El Capi-

tan and Cathedral rocks occupy the same relative positions in both valleys; so also do their Yosemite points and North Domes. Again, that part of the Yosemite north wall immediately to the east of the Yosemite Fall has two horizontal benches, about five hundred and fifteen hundred feet above the floor, timbered with golden-cup oak. Two benches similarly situated and timbered occur on the same relative portion of the Hetch Hetchy north wall, to the east of Wapama Fall, and on no other. The Yosemite is bounded at the head by the great Half Dome. Hetch Hetchy is bounded in the same way, though its head rock is incomparably less wonderful and sublime in form.

The floor of the Valley is about three and a half miles long, and from a fourth to half a mile wide. The lower portion is mostly a level meadow about a mile long, with the trees restricted to the sides and the river-banks, and partially separated from the main, upper, forested portion by a low bar of glacier-polished granite across which the river breaks in rapids.

The principal trees are the yellow and sugar pines, digger pine, incense cedar, Douglas spruce, silver fir, the California and golden-cup oaks, balsam cottonwood, Nuttall's flowering dogwood, alder, maple, laurel, tumion, etc. The most abundant and influential are the

great yellow or silver pines like those of Yosemite, the tallest over two hundred feet in height, and the oaks assembled in magnificent groves with massive rugged trunks four to six feet in diameter, and broad, shady, wide-spreading heads. The shrubs forming conspicuous flowery clumps and tangles are manzanita, azalea, spiræa, brier-rose, several species of ceanothus, calycanthus, philadelphus, wild cherry, etc.; with abundance of showy and fragrant herbaceous plants growing about them or out in the open in beds by themselves — lilies, Mariposa tulips, brodiæas, orchids, iris, spraguea, draperia, collomia, collinsia, castilleja, nemophila, larkspur, columbine, goldenrods, sunflowers, mints of many species, honeysuckle, etc. Many fine ferns dwell here also, especially the beautiful and interesting rock-ferns — pellæa, and cheilanthes of several species — fringing and rosetting dry rock-piles and ledges; woodwardia and asplenium on damp spots with fronds six or seven feet high; the delicate maidenhair in mossy nooks by the falls, and the sturdy, broad-shouldered pteris covering nearly all the dry ground beneath the oaks and pines.

It appears, therefore, that Hetch Hetchy Valley, far from being a plain, common, rock-bound meadow, as many who have not seen it seem to suppose, is a grand landscape garden,

one of Nature's rarest and most precious mountain temples. As in Yosemite, the sublime rocks of its walls seem to glow with life, whether leaning back in repose or standing erect in thoughtful attitudes, giving welcome to storms and calms alike, their brows in the sky, their feet set in the groves and gay flowery meadows, while birds, bees, and butterflies help the river and waterfalls to stir all the air into music — things frail and fleeting and types of permanence meeting here and blending, just as they do in Yosemite, to draw her lovers into close and confiding communion with her.

Sad to say, this most precious and sublime feature of the Yosemite National Park, one of the greatest of all our natural resources for the uplifting joy and peace and health of the people, is in danger of being dammed and made into a reservoir to help supply San Francisco with water and light, thus flooding it from wall to wall and burying its gardens and groves one or two hundred feet deep. This grossly destructive commercial scheme has long been planned and urged (though water as pure and abundant can be got from sources outside of the people's park, in a dozen different places), because of the comparative cheapness of the dam and of the territory which it is sought to divert from the great uses to which it was dedicated in the

Act of 1890 establishing the Yosemite National Park.

The making of gardens and parks goes on with civilization all over the world, and they increase both in size and number as their value is recognized. Everybody needs beauty as well as bread, places to play in and pray in, where Nature may heal and cheer and give strength to body and soul alike. This natural beauty-hunger is made manifest in the little window-sill gardens of the poor, though perhaps only a geranium slip in a broken cup, as well as in the carefully tended rose and lily gardens of the rich, the thousands of spacious city parks and botanical gardens, and in our magnificent national parks — the Yellowstone, Yosemite, Sequoia, etc. — Nature's sublime wonderlands, the admiration and joy of the world. Nevertheless, like anything else worth while, from the very beginning, however well guarded, they have always been subject to attack by despoiling gain-seekers and mischief-makers of every degree from Satan to Senators, eagerly trying to make everything immediately and selfishly commercial, with schemes disguised in smug-smiling philanthropy, industriously, shampiously crying, "Conservation, conservation, panutilization," that man and beast may be fed and the dear Nation made great. Thus long

ago a few enterprising merchants utilized the Jerusalem temple as a place of business instead of a place of prayer, changing money, buying and selling cattle and sheep and doves; and earlier still, the first forest reservation, including only one tree, was likewise despoiled. Ever since the establishment of the Yosemite National Park, strife has been going on around its borders and I suppose this will go on as part of the universal battle between right and wrong, however much its boundaries may be shorn, or its wild beauty destroyed.

The first application to the Government by the San Francisco Supervisors for the commercial use of Lake Eleanor and the Hetch Hetchy Valley was made in 1903, and on December 22 of that year it was denied by the Secretary of the Interior, Mr. Hitchcock, who truthfully said: —

> Presumably the Yosemite National Park was created such by law because of the natural objects of varying degrees of scenic importance located within its boundaries, inclusive alike of its beautiful small lakes, like Eleanor, and its majestic wonders, like Hetch Hetchy and Yosemite Valley. It is the aggregation of such natural scenic features that makes the Yosemite Park a wonderland which the Congress of the United States sought by law to reserve for all coming time as nearly as practicable in the condition fashioned by the hand of the Creator

— a worthy object of national pride and a source of healthful pleasure and rest for the thousands of people who may annually sojourn there during the heated months.

The most delightful and wonderful camp-grounds in the Park are its three great valleys — Yosemite, Hetch Hetchy, and Upper Tuolumne; and they are also the most important places with reference to their positions relative to the other great features — the Merced and Tuolumne Cañons, and the High Sierra peaks and glaciers, etc., at the head of the rivers. The main part of the Tuolumne Valley is a spacious flowery lawn four or five miles long, surrounded by magnificent snowy mountains, slightly separated from other beautiful meadows, which together make a series about twelve miles in length, the highest reaching to the feet of Mount Dana, Mount Gibbs, Mount Lyell and Mount McClure. It is about eighty-five hundred feet above the sea, and forms the grand central High Sierra camp-ground from which excursions are made to the noble mountains, domes, glaciers, etc.; across the range to the Mono Lake and volcanoes and down the Tuolumne Cañon to Hetch Hetchy. Should Hetch Hetchy be submerged for a reservoir, as proposed, not only would it be utterly destroyed, but the sublime cañon way to the

heart of the High Sierra would be hopelessly blocked and the great camping ground, as the watershed of a city drinking system, virtually would be closed to the public. So far as I have learned, few of all the thousands who have seen the park and seek rest and peace in it are in favor of this outrageous scheme.

One of my later visits to the Valley was made in the autumn of 1907 with the late William Keith, the artist. The leaf-colors were then ripe, and the great godlike rocks in repose seemed to glow with life. The artist, under their spell, wandered day after day along the river and through the groves and gardens, studying the wonderful scenery; and, after making about forty sketches, declared with enthusiasm that although its walls were less sublime in height, in picturesque beauty and charm Hetch Hetchy surpassed even Yosemite.

That any one would try to destroy such a place seems incredible; but sad experience shows that there are people good enough and bad enough for anything. The proponents of the dam scheme bring forward a lot of bad arguments to prove that the only righteous thing to do with the people's parks is to destroy them bit by bit as they are able. Their arguments are curiously like those of the devil, devised for the destruction of the first garden — so much

of the very best Eden fruit going to waste; so much of the best Tuolumne water and Tuolumne scenery going to waste. Few of their statements are even partly true, and all are misleading.

Thus, Hetch Hetchy, they say, is a "low-lying meadow." On the contrary, it is a high-lying natural landscape garden, as the photographic illustrations show.

"It is a common minor feature, like thousands of others." On the contrary it is a very uncommon feature; after Yosemite, the rarest and in many ways the most important in the National Park.

"Damming and submerging it one hundred and seventy-five feet deep would enhance its beauty by forming a crystal-clear lake." Landscape gardens, places of recreation and worship, are never made beautiful by destroying and burying them. The beautiful sham lake, forsooth, would be only an eyesore, a dismal blot on the landscape, like many others to be seen in the Sierra. For, instead of keeping it at the same level all the year, allowing Nature centuries of time to make new shores, it would, of course, be full only a month or two in the spring, when the snow is melting fast; then it would be gradually drained, exposing the slimy sides of the basin and shallower parts of the

bottom, with the gathered drift and waste, death and decay of the upper basins, caught here instead of being swept on to decent natural burial along the banks of the river or in the sea. Thus the Hetch Hetchy dam-lake would be only a rough imitation of a natural lake for a few of the spring months, an open sepulcher for the others.

"Hetch Hetchy water is the purest of all to be found in the Sierra, unpolluted, and forever unpollutable." On the contrary, excepting that of the Merced below Yosemite, it is less pure than that of most of the other Sierra streams, because of the sewerage of camp-grounds draining into it, especially of the Big Tuolumne Meadows camp-ground, occupied by hundreds of tourists and mountaineers, with their animals, for months every summer, soon to be followed by thousands from all the world.

These temple destroyers, devotees of ravaging commercialism, seem to have a perfect contempt for Nature, and, instead of lifting their eyes to the God of the mountains, lift them to the Almighty Dollar.

Dam Hetch Hetchy! As well dam for water-tanks the people's cathedrals and churches, for no holier temple has ever been consecrated by the heart of man.

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